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October 17, 1949

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STEEL

The Magazine of Metalworking and Metalproducing

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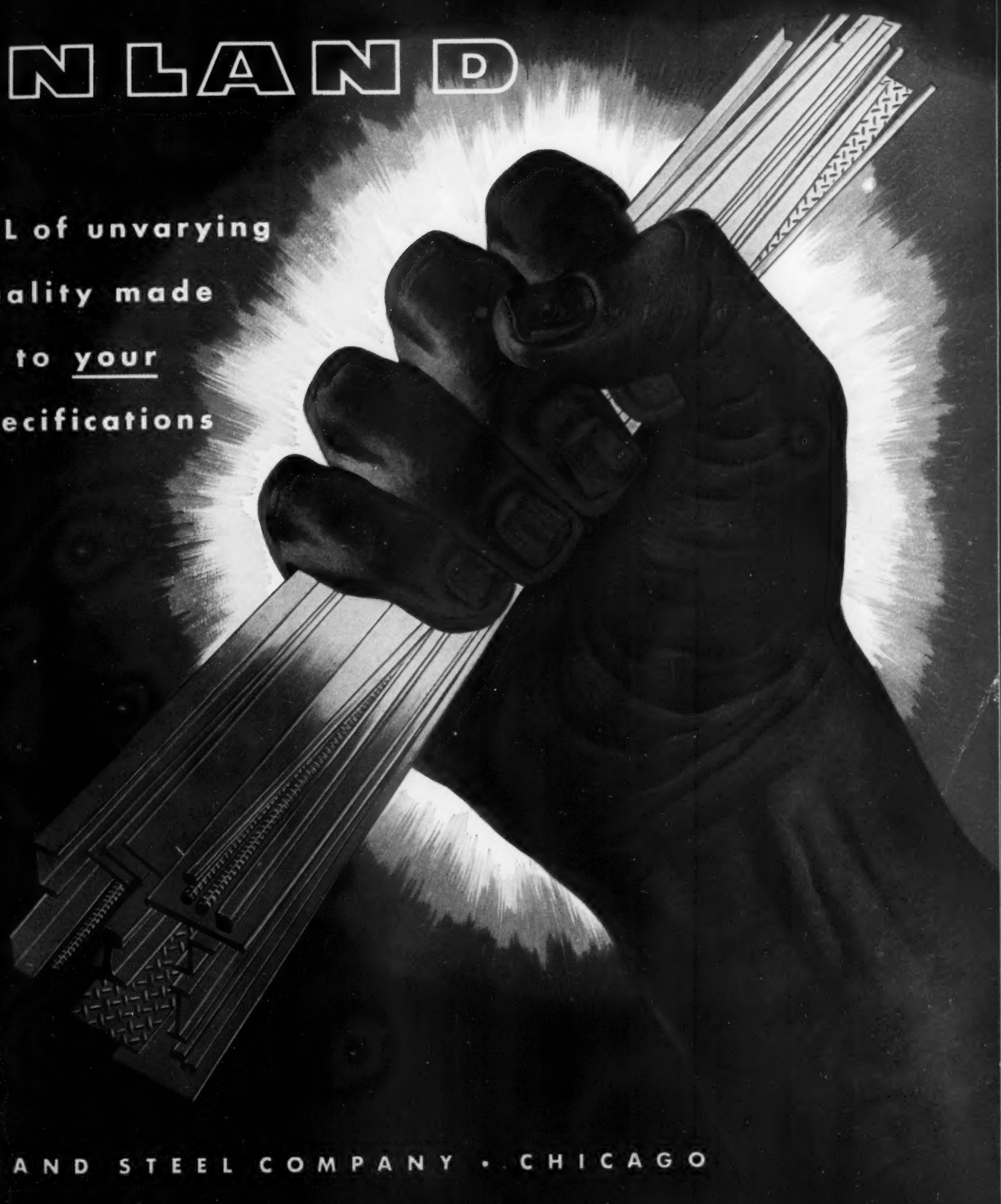

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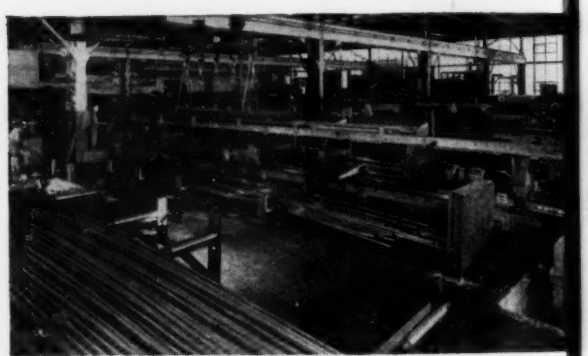

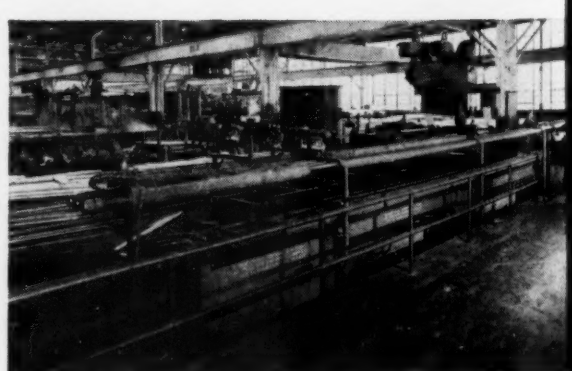

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 125, NO. 16 OCTOBER 17, 1949

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★ Denotes Regular Features.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

October 17, 1949

Hard Work Is Answer

At a time when the power of union leaders is strangling the nation it is opportune to consider what measures must be taken to rid the people of this menace. Whatever device is employed to end the present stalemate probably will be an expedient applicable only to this particular crisis. More important is a policy that will prevent future repetitions.

This calls for laws which will curb abuses of monopolistic power by either side. What are the prospects for such laws? A strong Taft-Hartley Act supporter, who lost his seat in Congress because of union opposition, answers in these words: "If Taft is defeated next year as a result of the strong campaign the unions are organizing against him . . . it will be five or ten years at least before any Congress will vote to destroy national labor union monopoly."

This ominous prediction cannot be taken lightly. The government administration and many union leaders will go all out to retain the monopoly now enjoyed. They have organization, money and determination to make an effective campaign. These advantages are impressive, but they do not mean that the battle for justice in labor relations is hopeless. If right-minded citizens will register their convictions in countable votes at the polls, union monopoly can be defeated.

The trouble has been that millions of persons who resent union leader monopoly have been slackers on election day. A check in an industrial county in a midwestern state shows that 37 per cent of the automobile dealers in the area did not vote in 1948 and 21 per cent were not even registered. Among independent grocers, 37 per cent did not vote and 32 per cent were not registered. Members of the Chamber of Commerce had a miserable record; 25 per cent did not vote and 19 per cent were not registered. In a check in another midwestern community the number of prominent industrialists who did not vote in 1948 was appalling.

Union monopoly exists largely because of the apathy of businessmen. Proponents of union monopoly work hard and vote. If businessmen, professional men and industrialists will work as hard as their opponents and will vote, they will win. It is as simple as that.

* * *

QUESTIONS RFC POLICY: Several months ago in this space mild apprehension was expressed as to the complications which would arise if Reconstruction Finance Corp. continued to broaden the scope of its loans to industry. Recent approval of a $34.4 million RFC loan to Kaiser-Frazer is attracting new attention to this subject.

From Washington it is indicated that $4.4 million of the loan will be used for tooling a proposed new small car, $18 million for retooling medium and higher priced models and $12 million for working capital. In Detroit stockholders and employees of other automobile manufacturing companies are wondering just how this deal stacks up. Does this loan of public money mean that stockholders and employees of General Motors, Chrysler and Ford, as taxpayers, are in reality subsidizing production, profits and jobs for a competitor?

Another question is to what extent, if any, does the granting of money to industry by RFC influence the management of the recipient companies in conforming to the Truman line on wages, pensions and the general aspects of the "welfare state"? Also, can RFC loans to industry

(OVER)

be extended much farther without lowering the entire status of RFC financing to the level of pork barrel politics? Finally, if RFC is to steadily increase its loans to industry, loans from banks and capital derived from sales of stock will decline below their already low levels and the government gradually will become the principal source of borrowed funds. Is this desirable?
—p. 57

* * *

CARTELS FOR W. EUROPE? A significant argument over cartels is brewing in Western Europe. Many industrialists in France, Belgium, Luxemburg and Britain believe cartels are desirable and will be particularly beneficial as an interim device to cushion the shock when the Marshall Plan ends in 1952. American officials oppose cartels and their influence in Western Germany thus far has induced the German government at Bonn to remain anticartel. Since no major cartel could survive without participation of Western Germany, no important cartels have been formed to date.

Numerous steel consumers on the continent lean toward the American view. They argue that cartels artificially peg prices, discourage modernization, support high cost producers and make prohibitive the investment of capital in European industries.

From this side of the Atlantic, one would think that Europe's prewar experience with cartels was disastrous enough to cause everybody to think long and hard before reinstating them into the postwar economy. —p. 53

* * *

AS VISITORS VIEW US: A British productivity team, which visited the United States under sponsorship of the Economic Cooperation Administration, has issued a 108-page report based upon its observations. It deals with the steel foundry industry and is the first report to be compiled by visiting teams from abroad.

The British foundrymen estimate that productivity in United States steel foundries is 50 to 90 per cent greater than in British steel foundries. Average man-year production in seven United States foundries is 19.34 tons, compared with 11.47 tons in seven British shops.

Visiting British foundrymen envied our tax system in that it does not discourage incentive to the extent that British taxes do. They concluded that "compulsion of fear" is a factor in American industry. They also observed that labor in United States foundries, as judged by British standards, is "conspicuously unskilled."

Close study of this report may result in benefits on both sides of the Atlantic. There should always be two-way traffic for good ideas.—p. 52

* * *

CUTS PROCESSING COSTS: Increasing acceptance of high frequency induction heating methods probably is due to the fact that in many applications the end result in quality and economy of work more than offsets the initial high cost of equipment.

Among the advantages claimed for induction heating are that it permits rapid and accurate control of applied heat, that heat can be applied exactly to the area desired, that no warm-up time is required, that simplicity of control enables unskilled employees to operate the equipment, scaling and oxidation are held to a minimum, warpage is negligible and heating time and cost are low.

In spite of these many advantages, the process has its limitations and cannot be used indiscriminately. Properly employed on jobs such as through heating for forging, annealing for forming and drawing operations, and selective hardening, it offers an effective means of reducing processing costs. —p. 72

* * *

NEED FIRM OPPOSITION: A number of important bills will come up for discussion in Congress next year. Among them are revisions in laws to discourage monopoly, an increase in veterans pensions, extensive changes in tax laws, omnibus ship subsidy bill, overhauling of the patent law, national science foundation bill, national health bill and possibly additional powers for government to participate in industrial expansion in order to combat unemployment.

Many of these measures are highly controversial. Some of them are distinctly part of the Truman concept of the welfare state. All of them will affect American industry directly or indirectly. For these reasons it would be desirable if the opposition to objectionable features of these bills could be mustered more strongly around a more forceful leadership. The need for effective work by the minority party in our two-party system never was greater than it is now. —p. 50

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

STRIKES— Expect increasing curtailments in metalworking activity from now on as effects of the steel and coal strikes spread (pp. 43, 44, 45). Steelmakers fear that when or if stoppages reach critical proportions the government might seize plants by exercising emergency authority under the Selective Service Act.

MILL PRICING—A settlement with the Federal Trade Commission may help solve your mill pricing problems (p. 48). These points have been agreed upon by principals in the FTC-steel case: 1. Mills can absorb freight if they are legally competing against each other; 2. mills must sell at f.o.b. prices if so requested by consumers. No agreement has yet been reached on abandonment by steel companies of standard extras and deductions . . . Revisions in the O'Mahoney freight absorption bill give promise of renewed congressional debate on the measure (p. 48).

SALES AID—Is financing a factor curbing sales of your products? (p. 46) Westinghouse Electric Corp. is making sure its dealers and customers know how to use all the financing available. The company a year ago introduced a plan to simplify and safeguard installment buying. This program will be pushed further now that Westinghouse has put seven finance representatives into the field to provide advice and assistance.

ORE BENEFICIATION— Erie Mining Co. is taking another step toward its goal of producing 10 million tons of concentrated iron ore from taconite annually at Minnesota plants (p. 49). In applying to the Minnesota Department of Conservation for sufficient water, the company seeks assurances that it will be worth while to continue engineering studies to determine the precise nature and size of its program. Processes finally to be used will probably follow closely those now being tested at Erie's preliminary beneficiating plant in operation near Aurora, Minn.

EUROPEAN CARTELS— Look for increasing pressure from Western Europeans for American approval of cartels (p. 53). The U. S. voice in the control of Western Germany—Ruhr producers are essential to the success of any trust—has thus far prevented the formation of any permanent monopoly.

CONSERVATIVE APATHY—If you are a political "conservative," you may be alarmed over the apathy of the opposition to "liberal" measures in Congress (p. 50). Reciprocal Trade Agreements Extension went through without a hitch. The Social Security Expansion bill passed the House by a huge margin. The Antimerger bill passed the House and is ready for Senate action. Differences in the separately passed measures to boost the minimum wage to 75 cents are being ironed out in conference.

FORD TRANSMISSION— Ford Motor Co. and Borg-Warner Corp. are tooling to produce a new automatic transmission which will sell for not more than $150 (p. 57). The device will not be available for installation on Ford and Mercury models before next summer.

HERE AND THERE IN INDUSTRY—Mill distribution of four classes of finished steel—cold-rolled sheets, line pipe, reinforcing bars and galvanized sheets—hit record highs for the year in August (p. 54) . . . Cutting costs is the increasingly predominant theme at conventions attended by metalworking executives (p. 55) . . . How to do business with the Atomic Energy Commission is told in a booklet available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, for 10 cents a copy (p. 52) . . . There are now 34 areas with 12 per cent or more unemployment (p. 47) . . . Nine companies have announced they are buying or have bought corporate assets or are building or have built new plants (p. 60).

INLAND STEEL

"'Tain't fair—he's standing on slip-resistant 4-WAY Safety Plate!"

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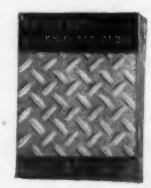

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Inland 4-WAY SAFETY PLATE

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STEEL
A PENTON PUBLICATION

Strike Paralysis Lies Ahead

Few metalworking plants down for lack of steel. Many support steel companies' resistance to free pensions and insurance. Want showdown now

CURTAILMENTS in metalworking activity resulting from the steel and coal strikes will become more apparent this week, may reach critical proportions by Nov. 1.

To date, few companies have been forced to close or to reduce operations for want of steel. The list is expected to grow rapidly in the weeks immediately ahead as stocks become unbalanced and as parts and components become hard to get.

Customers Support Resistance—Many metalworking executives hope steel producers will hold firm in their resistance to the union demands for noncontributory pensions and insurance. Some are willing to close their plants when they run out of steel if that will help support the industry's position.

They want a showdown now on organized labor's expanding demands.

Both Sides Adamant—No weakening in the position of either the companies or the union is yet apparent. The government, through its conciliation director, Cyrus Ching, continued to seek a settlement.

CIO President Philip Murray is touring steelmaking centers making "pep talks" to strikers. While the steelworkers show little enthusiasm for the strike, they are staying in line.

Seeks Industry-Wide Settlement—Mr. Murray is insisting on settlements on an industry-wide basis. Ability to pay will not be considered by the union. If the companies can't pay, says Mr. Murray, they have no right to be in business.

The union indicates it will strike fabricating companies who refuse to grant free pensions and insurance. Contracts of many of these companies expire in the next few weeks. A dozen or so have signed up under union terms.

Settlement Chances—Growing concern is expressed by steelmakers over the possibility of government seizure of plants under the Selective Service Act. Management believes that if the strike continues until industry is paralyzed, the administration may take over the plants, grant the union demands, and then offer to return the mills to their rightful managers. This procedure was used in forcing coal operators to grant royalties to support the miners' now-bankrupt welfare fund.

Automakers Plan Changeover

Model changeovers are being scheduled for November by Ford, General Motors and possibly Chrysler. Steel supplies generally are adequate to run until then and many auto parts suppliers say they can keep going as long as the assembly plants.

Old "Friends" Return

If your phone rings this week and a voice greets you like a long lost brother, chances are that you will be talking to a gray marketer. Metalworking companies in Chicago, Milwaukee and other midwestern cities are being offered hot and cold-rolled sheets, carbon and alloy bars, hot or cold-finished, wire and other products at premium prices by salesmen they haven't heard from in months.

Gray market prices range all over the lot. Most offerings are at a cent or a cent-and-a-half over warehouse prices. A few offerings of large quantities have been made at or slightly below warehouse prices. Steel purchasing agents question the quality of such offerings.

CYRUS CHING
. . . let's settle this thing

Most metalworking companies have comfortable inventories of steel and are not paying much attention to gray market offerings. Where they are short in particular products, they are filling in their inventories through regular warehouses.

Some metalworking companies are planning to sell their surplus inventories of "cats and dogs" acquired earlier through conversion deals.

Should You Order Now?

Would it do any good to send a steel order in to struck companies now? Most people apparently think not.

Steel sales offices report the new order letter pile is comparatively small and few if any Chicago companies can give definite poststrike delivery promises. Thinking that predominates is that it is impossible to set up schedules now. Time required for delivery after the strike ends will, of course, vary by products.

Many consumers, in expectation of the strike, placed orders they knew could not be delivered before the strike began. These people have priority. Mills generally did not have full order books for November and if the strike ends early next month, your presently placed order might be scheduled for late December on some products.

Good Future if Tieups Are Brief

You can expect your steel requirements to be met adequately and the nation's economy to improve next year if steel and coal tieups are not too long.

This is the forecast of David C. Roscoe, assistant general manager of sales for Bethlehem Steel Co., who spoke before the 39th annual convention of the National Association of Sheet Metal Distributors in Atlantic City, N. J., last week. The meeting was held in conjunction with conventions of the National Wholesale Hardware Association and the American Hardware Manufacturers Association, Oct. 10-13.

Light-gage galvanized sheets and roofing might continue tight in the early months, but they should be readily available by the middle of 1950, Mr. Roscoe believes. As of Oct. 1, demand still exceeded supply for most classes of pipe, cold-rolled

sheet, light-gage galvanized sheets and tin plate. Supplies of most other products were good.

Metalworking Firms Struck

About 16 out of 75 major metalworking plants, other than steelmaking, in the Pittsburgh-Wheeling-Youngstown area are on strike. Of the 90,000 wage earners in these 75 plants, 8000 are striking.

Many metalworking plants are operating under contract extensions which permit the workers to strike at a moment's notice or within a specified time ranging up to 30 days. Union policy will probably keep employees on the job at these plants as long as possible. A check of metalworking companies in the area indicates that most will be able to maintain partial operations for another three or four weeks before their steel supplies are exhausted.

Pennsylvania State Employment Service estimates the number of striking workers in the Pittsburgh district as: Steel, 112,600; coal, 12,550; metal fabrication, 1250. Workers furloughed because of the steel and coal strikes total 6500 railroad employees; 1200 in stone, clay and glass industries; 510 in construction; and 11,300 in wholesale and retail categories.

Suppliers' Shortages Felt

You may be more worried about your suppliers running out of steel than about shortages in your own plant.

McCormick Works of International Harvester Co. in Chicago is grappling with this situation. Shortage of steel forced its implement wheel supplier to close. With no wheels, production of implements comes to a halt and between 900 and 1000 employees are laid off. Other parts on which production depends are growing scarce as a strike in another supplier's plant continues. So in the next two or three weeks the remaining 2500 workers must be furloughed.

Can Firm Has Enough Steel

Inventories of steel for manufacture of containers in American Can Co. plants will, in general, be adequate to meet customers' estimated needs unless the steel strike continues for an exceptionally long period, Carl H. Black, president, says.

U. S. Strike Crimps Canada

A prolonged U. S. steel strike will have a serious effect on Canadian industry which relies on American mills for about 25 per cent of its total steel requirements. Canadian consumers have been carrying, on the average, only about 14 days' inventory. Government officials fear that a return to wartime controls on distribution of steel may be necessary.

Canada consumes over 4 million tons of steel annually, about 1 million tons of which normally comes from south of the border. Canadian steel mills are operating at capacity.

Frisco Steel Users Well Off

Steel consumers in the San Francisco area have finished product inventories available for at least 60 days. This unusually good situation exists because well stocked bay area warehouses signed an agreement to end their 109-day labor tieup just as the steel strike began.

An additional aid to steel users will be continued operation of two West Coast plants: Kaiser Steel Corp.'s Fontana, Calif., mill and Pacific States Steel Co.'s plant at Niles, Calif. All other major producers are closed.

September Ingot Output High

Production of steel ingots and steel for castings in September totaled 6,572,284 net tons, or 83.3 per cent of capacity. Third quarter output was 19,066,151 tons, or 78.8 per cent of capacity. Production for the first nine months amounted to 64,991,496 tons, or 90.4 per cent of capacity.

American Iron & Steel Institute reports show that September figures compare with 6,714,745 tons produced in August, or 82.2 per cent of capacity, and with 7,424,844 tons produced in September, 1948, or 96.2 per cent of capacity. Output in the third quarter of 1948 totaled 21,947,195 tons, or 92.7 per cent of capacity. Corresponding figures for the first nine months of 1948 are 65,065,238 tons produced and operations at 92.2 per cent of capacity.

The steel strike is impeding release of some regular reports because a number of companies haven't access to records in plant offices.

C & O Revenue Falls

If the coal strike should continue through October, revenues of Chesapeake & Ohio Railway from hauling the bituminous fuel will be reduced by $15 million. C & O is the largest originating carrier of bituminous coal. It comprises about 68 per cent of the total cargo tonnage handled by the road.

Since start of the three-day work week in the coal mines last month and the subsequent complete closedown of the bituminous mines, C & O has furloughed about 8500 workers.

W & L E Furloughs 1073

Layoffs by the Wheeling & Lake Erie Railroad, predominantly a coal and iron ore carrying line, have reached 1073 since the coal and steel strikes started.

Nickel Plate Lays Off 849

Nickel Plate Railroad has laid off 849 workers, or about 6 per cent of its total working force, because of the steel and coal strikes.

Railroad Recalls 300

The Delaware & Hudson Railroad has recalled about 300 workers to its shops in Colonie, N. Y. Still not called back are 260 workers laid off last June at these facilities.

Coal Strike Dampens Joy

"Prolonged and cumulative disturbances" in the coal industry have curtailed operations and reduced earnings of Joy Mfg. Co., President

CINCINNATI
. . . the lines grow longer

J. D. A. Morrow says. The Pittsburgh firm makes mechanical mining equipment. Mr. Morrow says the three-day week in coal and later the complete stoppage of mining has caused mine operators "not only to postpone placing new orders with us but also led them to make cancellations of some orders already placed and to instruct us to hold up deliveries on others."

Limestone Quarries Hard Hit

Limestone quarries in the Bessemer-Hillsville district of western Pennsylvania and eastern Ohio are hard hit by the steel strike.

Quarries operating there are the Carbon Limestone Co., Bessemer Limestone & Cement Co. and Pittsburgh Limestone Co., the last a U. S. Steel subsidiary. Officials of the

quarries say they can't pile up the stone, so must discontinue quarrying during the steel strike. Part of their forces are at work removing overburden and doing other jobs, but this cannot be carried on for long.

Sales Good if Strike's Short

Fourth quarter sales will be good if the steel strike is not prolonged, says Grant S. Diamond, president of Electro Refractories & Alloys Corp., Buffalo. Third quarter sales were up 10 per cent from the second period, and the fourth quarter would show continued improvement under normal conditions.

Inland Furloughs Ship Crews

Inland Steel Co. has furloughed most of the crews of four big ore carriers, *L. E. Block, P. D. Block, E. J. Block* and *Joseph Block,* because of the steel strike.

Lakes Ship Repairing Down

American Ship Building Co., Cleveland, is experiencing a decline in repair business on Great Lakes vessels partly because of the steel and coal strikes. The company thinks reduced demand for steel and coal and the labor disputes will prematurely curtail the shipping season this year.

Grain Bin Plan Continues

The steel strike, say Commodity Credit Corp. spokesmen, is causing a few delays in deliveries but will not prevent execution of the grain storage bin program in time to prevent dumping of grain on the ground at farms this fall.

When orders for storage capacity of 280 million bushels were placed last summer, 60 per cent, or 164 million bushels were to be built of steel and the remainder of other materials. Steel storage capacity whose delivery is held up by the steel strike comes to 27 million bushels. To make up this shortage, CCC has ordered that amount of capacity to be made up in wood and aluminum, and shipments against these new orders already are going forward.

Santa Ahead of Strike

A lengthy steel strike should have little effect on availability of Christmas merchandise, says Arthur Keating, president and chairman of Ekco Products Co. The Chicago firm makes kitchen utensils and many other products.

Steel Shortage Hits Thor

Inadequate steel supplies will cause a suspension in production of Thor Corp.'s Automagic washer this week, says Raymond J. Hurley, board chairman. Several hundred employees are expected to be laid off in the firm's Chicago plant when production is curtailed. Thor also makes ironers at the same plant but has enough steel to continue this line for another 30 days.

September Employment Off

Labor disputes in the coal, steel and railroad industries are causing secondary unemployment: They helped boost initial claims for unemployment insurance by 16,100 to 245,200 during the week ended Oct. 1. This gain in initial claims was also caused by temporary layoffs in the Michigan auto industry.

Unemployment insurance continued claims, indicating completed weeks of unemployment by individual claimants, declined by 96,505 to 1,806,073 during the week ended Oct. 1, the lowest level reached since the second week in February. The decline in continued claims reflects increased industrial activity in late August and September. Initial claims came mostly from Illinois, Michigan, New York and Pennsylvania.

Pension Tryout in Toledo

UNITED Auto Workers will serve demands on about 125 manufacturing plants in the Toledo, O., area for payments of 10 cents an hour for every employee into an "areawide pension fund," starting next Jan. 1.

A spokesman declares the union will not hesitate to strike any plant which refuses to cooperate. An ultimatum was delivered to the first 15 companies last week. Under direction of the UAW international headquarters, the plan is being initiated in Toledo as a testing ground. The 15 companies initially involved, nearly all in the automotive industry, employ 20,000.

Why a Strike? Company Ads Raise This Question

WHY should there be a steel strike? That's the question raised in full-page newspaper advertisements by several steel companies which point out how advantages at their plants surpass union demands.

Great Lakes Steel Corp., Detroit, setting forth three examples of benefits from its nine-year-old retirement income plan and Social Security, shows: 1. A laborer, lowest-paid of production men, would receive a monthly pension of $128.29, or 60.2 per cent of his monthly average wage of $212.79; 2. a millwright would get a monthly pension of $171.50, or 56 per cent of his average monthly earnings of $306.21; and a heater would get a monthly pension of $392, or 61.5 per cent of his average monthly pay of $638.20.

They Don't Stand Still—The Great Lakes examples are based on straight-time hourly wages for a 40-hour week with each man entering the plan at age 30 and staying in it to age 65, and remaining on the same job 35 years. Workers, however, usually move up.

Under the Great Lakes plan employees make financial contributions to the retirement fund. The laborer's monthly contribution is $7, the millwright's $11, and the heater's $32. These help provide the laborer with a life monthly income of $73.50 from the retirement plan, the millwright with $115.50, and the heater with $336. These are supplemented with Social Security benefits of $54.79 to the laborer, $56 to the millwright, and $56 a month to the heater.

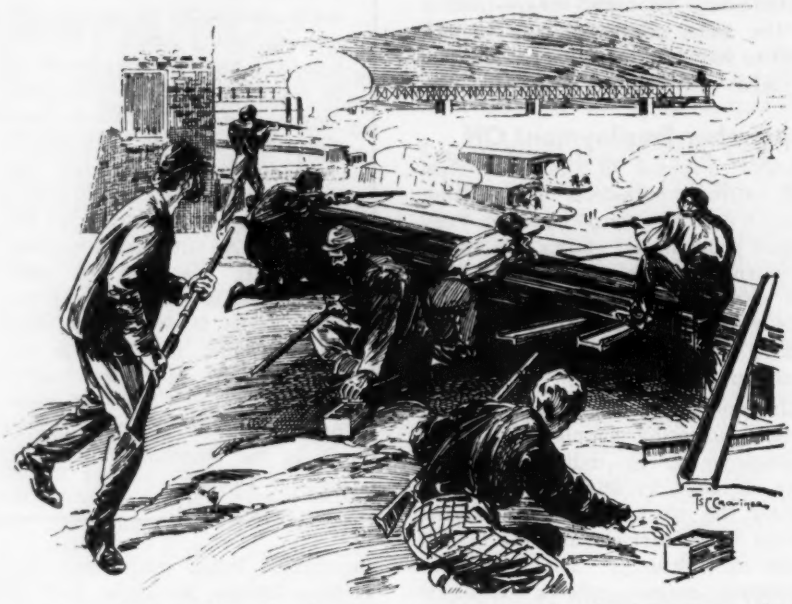
"With a pension plan so plainly beneficial to Great Lakes employees why should our plants be idle today?" the company asks.

Inland Gives Answer—One answer, according to Inland Steel Co.'s advertisement, is: "The trouble with the steel strike is simply that the CIO is determined to establish a nationwide steel pattern on its own terms. No offer, however fair, seems to be acceptable if it differs from its pattern."

Inland says it supposed the union struck rather than permit a worker to pay part of the cost of a welfare plan. "But," asserts the company, "that can't be it, for the CIO has recently accepted welfare plans in automotive and other industries in which the worker does pay part of the cost." The company further points out that the CIO has contracts with other companies where the pension is $100 a month, including social security, after thirty years of service. "At Inland it would amount to $147 per month, including social security, for the average worker," the company declares.

Advertisement of Lukens Steel Co., Coatesville, Pa., itemizes benefits under the plan it has offered the union. Lukens would pay two-thirds of the cost, the employee one-third. It also states that although Lukens considers pensions are not bargainable now, it offers to continue its present hourly-worker pension plan for which the company pays the entire cost.

Steel's Labor Picture Changes



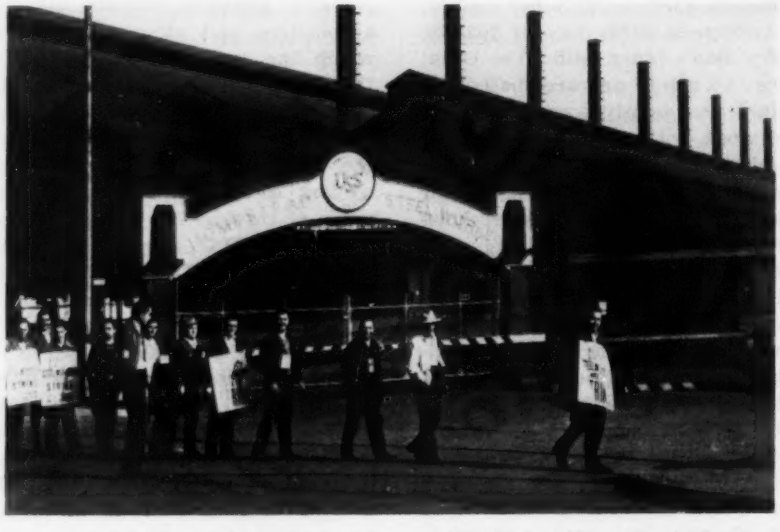
. . . from this in 1892 when Homestead strikers fired on Pinkerton guards

DRAMA in this steel strike? Oldtimers claim the highest dramatic peak in steel's labor history is still the Homestead conflict of 1892.

In July of that year Carnegie Steel Co. scaled down tonnage rates to workers at its Homestead, Pa., plant, many of whom were paid on a production basis. Output had risen so rapidly at this works that the take-home pay of nearly all the 3800 wage earners would have remained the same, but the old Amalgamated Association led the men out.

The union took a militant stand against employees trying to go to work and made elaborate preparations to prevent anyone from crossing its lines. These precautions included the chartering of a steam boat and the use of a fleet of 50 row boats to patrol the Monongahela river on which the Homestead plant had frontage.

Carnegie hired 300 Pinkerton agents to protect its property and tried to move them in by way of the river. On July 6 the detectives were concealed on barges, but news of their attempt to reach the plant leaked out. Enraged Homestead strikers tore down part of a wooden fence at the plant and rushed to the river. The Pinkerton men were driven back to their barges. The National Guard arrived two days later, but intermittent violence lasted until Nov. 21, 1892, when the strike was called off.



. . . to this peaceful picketing now at the present Homestead plant

Sales Aid

Westinghouse assigns seven men to help dealers use its financial plan in buying

KNOW HOW to use all the financing available to you in running your business?

Westinghouse Electric Corp., Pittsburgh, isn't taking a chance that some of its dealers don't.

This company, which a year ago introduced its "Equity Plan" to simplify and safeguard installment buying and encourage local bank financing of electric appliance purchases by dealers and their retail customers, is now putting seven installment finance representatives into the field to provide on-the-spot advice and assistance to banks and dealers in all parts of the country.

Expert Advice Available—One man is being assigned to each of seven merchandising districts and will be responsible for mutually beneficial financing relationships between dealers and banks in his specific territory. Thus, expert technical assistance on financing problems will be provided on a national basis, says C. F. Gilbert, manager of the company's Retail Finance Division.

Under the "Equity Plan" banks are given broad protection in financing dealer inventories of Westinghouse merchandise. Through a wholesale repurchase agreement, Westinghouse agrees to repurchase any such merchandise which may have been repossessed. "Given such assurances," Mr. Gilbert points out, "the bank can safely provide financing for the majority of dealer's purchases."

Benefits—Here is where Westinghouse benefits: Dealers are enabled to carry a more representative display of Westinghouse merchandise.

Dealers benefit too: Not only do they have a more complete line to sell from but their working capital is conserved since they do not have to pay in full for the products at time of purchase.

Consumers also benefit, says Mr. Gilbert, through economies made possible by local bank handling. "By handling such r e t a i l financing through the local banks, local men with clear understanding of local credit conditions are making the decisions. We believe this to be realistic procedure and extra protection against unsound installment selling."

Plan Is Voluntary — The "Equity Plan" is entirely voluntary and both banks and dealers are free to make financing arrangements dictated by their local requirements. A survey, however, shows 85 per cent of the

Westinghouse appliance dealers who finance their inventories are doing so through their local bank largely as a result of the "Equity Plan."

Further testimony of acceptance of this program, Mr. Gilbert points out, is the fact that almost 900 banking locations in 37 eastern states alone now are available to finance the appliance, radio and television inventories of Westinghouse dealers and their customers' retail purchases.

Since the Westinghouse "Equity Plan" was announced a number of other national manufacturers have completed similar bank financing programs and many others considering such plans are corresponding with Westinghouse.

Distressed Areas Increased

HOPE that the recent upsurge in business would diminish the need for the President's program of "spot assistance" to distressed areas is not receiving much tangible support.

Two spots—Centralia, Ill., and Biddeford-Sanford, Me.—have been removed from the list but four new ones added — New London, Conn., Fitchburg, Mass., Lowell, Mass., and Greensburg, Pa. There are now 34 areas with 12 per cent or more unemployment on the basis of unemployment compensation payments.

The program comprises assistance through the channeling of procurement, construction and loans "and other activities of the federal government to alleviate unemployment in areas where it is serious" but actually the results have not been spectacular. There are many statutory curbs on the program. Loans have to be made with reasonable assurance that they will be repaid. Construction projects require advance planning and appropriations. All involve considerable red tape. Procurement, except in those instances where the contracts can be placed by negotiation, calls for competitive bidding and the award of the contract to the low bidder.

The Commerce and Labor Departments continue the active agencies in administering the program. Commerce has organized local groups in each of the critical labor market areas to see that firms in those areas get bidding opportunities, and to render all possible services. Some of the communities are going so far as to seek new industries and new business for old industries. All are encouraging local and state public works.

Gray Iron Award to Cannon

GOLD MEDAL Award made by the Gray Iron Founders Society Inc., Cleveland, will be presented to George W. Cannon, retired chairman of the board, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. The society's highest award will be made at its 21st annual meeting at the Edgewater Beach Hotel, Chicago, Oct. 28.

Mr. Cannon played a major role in the work of the War Production Board and later the Munitions Board of the National Military Establishment.

Curtiss-Wright Gets Contract

COLUMBUS, O., plant of Curtiss-Wright Corp. has been awarded a $1.2 million contract by the Air Force to produce spare parts for C-46 Curtiss Commando airplanes.

The plant will begin production immediately. Final deliveries will not be completed until March, 1951. Other contracts will add $100,000 more to the facility's backlog.

Permanente Aluminum Sales Up

PERMANENTE Metals Corp., Oakland, Calif., sold 60 per cent more aluminum in September than the average volume for the preceding three months.

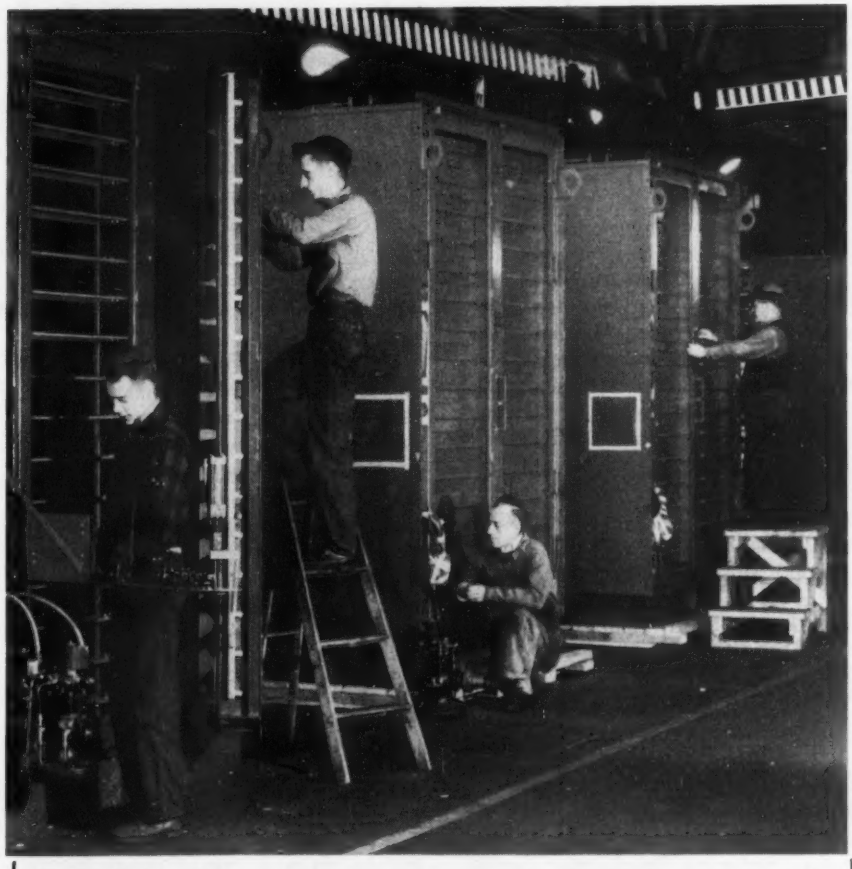
The company explains that the gain results from: Acceleration of industrial activity; its entry into production of aluminum foil, wire and cable; and normal seasonal improvement in aluminum sales.

Utah Plant Partially Closed

AMERICAN Smelting & Refining Co. has partially closed its Murray, Utah, plant. Some minor operations will be continued until the unit is permanently shut down by yearend. Most of the 250 Murray workers will be absorbed by the company's new anode plant at Garfield, Utah. That facility is about 25 per cent completed.

To Make Buttweld Pipe

BUTTWELD pipe from 1 to 4 inches in diameter will be made on the new pipe mill being constructed by Youngstown Sheet & Tube Co. at its Indiana Harbor Plant, East Chicago, Ind. The pipe mill is scheduled for completion in May, 1950. When the



DUST CATCHERS: Electronic air scrubbers for steel mills in the United States, Brazil, France and South Africa are in the making at Westinghouse Electric Corp.'s Sturtevant Division plant, Boston. The vault-like cubicles contain precipitron cells, electronic air cleaners which remove 90 per cent of air-borne dirt and dust. Each of the cubicles can clean more than 36 tons of air an hour. NEA photo

mill is ready for scheduling the company will discontinue its production of lapweld pipe in the Chicago area.

Pricing Settlement?

Way would be opened for some absorption of freight. Standard extras would be out

IF the currently discussed settlement in the Federal Trade Commission case against the steel industry's old multiple-basing-point, delivered-price system is accepted by the parties in the case, the way will be opened to a substantial modification of the present industry policy of quoting f.o.b. mill prices.

Under the proposed settlement each steel mill would be assured of the right to absorb freight "excepting when such freight absorption unlawfully lessens competition." This means mills would be able to absorb freight in competing against each other, but such practices as quoting a lower price to one warehouse than to others in the same city would be taboo.

Standard Extras Out — Another change which the proposed settlement would bring about is abandonment of existing standard extras and deductions to be added to or subtracted from base prices for each product. Fixing of extras and other price elements would have to be done on an individual company basis. This feature is said to be the one that has caused respondents to move slowly in considering acceptance of the proposed settlement. There is no opposition to the other two points, which call for establishment of an f.o.b. price at each mill and willingness on the part of each mill to sell at this mill price if so requested by consumers. Purpose of this latter clause is to enable consumers to buy at mill prices and haul the steel to their plants by rail, truck or water—whichever is more advantageous.

Should this settlement be accepted by the steel companies it would not become final until approved by the Federal Trade commissioners.

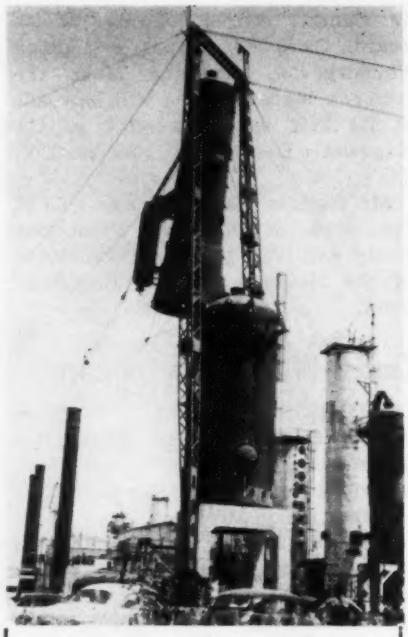
Pricing Bill Revised

The O'Mahoney freight absorption bill had three significant changes in it last week at the end of a House-Senate conference agreement.

Change No. 1 represents a considerable softening from the Carroll limitation of the right to absorb freight to meet the equally low price of a competitor in good faith.

Change No. 2 spells out specifically the provision that justification for a price discrimination may not be used as a defense for antitrust law violation.

Change No. 3 was considered the one that would provoke most opposition. It would make it possible to proceed effectively in cases involving illegal competitive practices only by producing reliable probative and substantial evidence. Under prevailing procedure the Federal Trade Commission can reinforce charges of illegal competition with any evidence whatever and the courts must support them.



UNIQUE CONSTRUCTION: The 150-foot catalytic cracking tower at this refinery will be on stream ahead of schedule because of the construction method. Towers like this, previously constructed vertically piece by piece, had to be raised and welded into position. This one, fabricated by Southwestern Engineering Co., Los Angeles, was fabricated at ground level on a horizontal concrete slab. Here, the reactor, intermediate skirt and stripper assembly, weighing 85 tons, are lifted into place atop the regenerator

Approves Freight Rate Cuts

FREIGHT RATE reductions are authorized on a permanent basis now on iron and steel carried by rail from U. S. Steel Corp.'s Geneva Steel Co. in Utah to West Coast points.

New rate authorized by the Interstate Commerce Commission is $12.60 a ton. This is $5.60 lower than could be charged as a result of freight rate adjustments permitted by the ICC in the last few years.

Machinery Shifts Continue

United Engineering, Cincinnati Lathe acquire subsidiaries. industry concentrates facilities

CHANGE in ownership of two more prominent machinery building firms focuses attention on the shifts in the industry which have become increasingly frequent in the postwar period. Latest announcements concern the acquisition of Canedy-Otto Mfg. Co.'s line of upright, sensitive and radial drills by Cincinnati Lathe & Tool Co. —Cincinnati Milling Machine Co. subsidiary, and United Engineering & Foundry Co.'s purchase of Stedman Foundry & Machine Works Inc., Aurora, Ind.

As in previously reported purchases the buyers have enlarged the scope of their business by diversifying their line. Since the end of the war there have been more than 30 such acquisitions by machinery builders. Some of the deals involved the sale of war babies. Old and well established firms, too, are passing out of the picture. The wartime explosion which saw machinery builders' plants springing up in new areas has been followed by a postwar implosion resulting in a withdrawal to traditional machinery building centers.

Cincinnati Lathe will transfer Canedy-Otto's engineering, manufacturing and sales operations from Chicago Heights, Ill., to Cincinnati. Thus another machine tool line is added to the concentrated machinery building operations in suburban Oakley.

United Engineering's purchase of Stedman is reported to involve $1 million. The Pittsburgh company plans to continue its new subsidiary's operations under the Stedman name.

Old Story Gets New Twist

A new twist to an old story is the German language catalog prepared by Amertool Services Inc., Cincinnati. The export firm formed by 11 American machine tool builders is sending the catalog to its German representative, Stengel & Co., Weisbaden. The situation is the reverse of prewar days when German builders had their catalogs translated to English for distribution here.

Sell More, Predict Less

Greater sales effort without undue attention to forecasts of either the optimistic or pessimistic variety is the steady, sure fire formula for improved business. E. K. Welles, president, Charles H. Besly & Co., Chicago, set forth this argument at a sales and executive meeting of the tap and grinder manufacturing firm.

Erie Mining Seeks Water Supply for Proposed Ore Beneficiation Plants

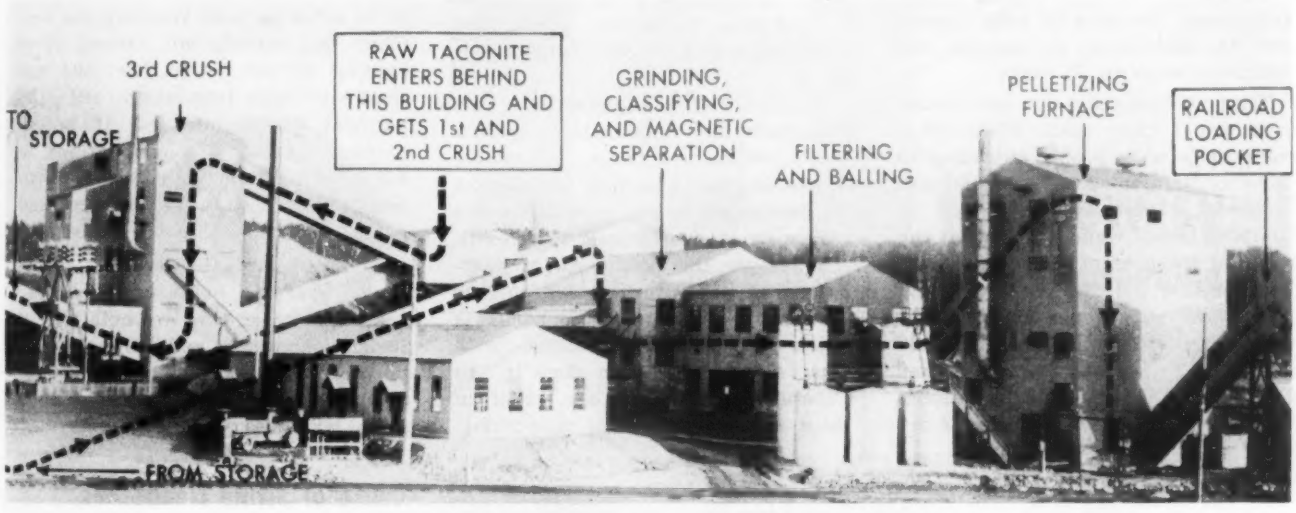
ERIE Mining Co. is moving closer toward its goal of producing 10 million tons a year of concentrated iron ore from taconite. The company is applying to the Minnesota Department of Conservation to get an adequate water supply for beneficiation plants proposed for construction near Aurora, Minn.

For some years Erie has been experimenting at its Hibbing, Minn., laboratory with processes for obtaining a suitable iron ore concentrate from taconite. Last year the company began operating a preliminary plant near Aurora, using full-scale equipment. Shown below is the mechanical arrangement of this facility which has a capacity of 200,000 tons of concentrates yearly. If larger plants are built they will be designed to use processes similar to those used in the preliminary unit.

Water Essential—No final decisions have been made about building the large plants. Sufficient water must be assured before engineering studies can be concluded to reach these decisions. The water application asks permission to construct a channel, dams, spillways and pumps to form a reservoir. The first large plant contemplated would have capacity to produce 2.5 million tons of concentrates a year. Erie would build additional units as the need arose until facilities to produce 10 million tons annually would be available.

Billions of tons of the low-grade iron-bearing taconite exist on the Mesabi range. High grade ores in the area are running out, can last only about 18 more years on the average. Erie is operated by Pickands Mather & Co., Cleveland, for Bethlehem Steel Corp., Youngstown Sheet & Tube Co., Interlake Iron Corp. and itself.

From Three to One—The process now being experimented with reduces three tons of taconite to one ton of pellets containing 63 to 65 per cent iron. The crude taconite passes through a series of dry-crushing and wet-grinding operations which pulverize it so that the iron particles can be separated magnetically from waste siliceous material. To make a suitable charge for the blast furnace, the fine iron concentrate is then rolled into walnut-size pellets. These are baked to a strength adequate to withstand the journey to furnaces.



ERIE MINING CO.'S PRELIMINARY BENEFICIATION PLANT
. . . taconite is turned into pelletized ore ready for furnaces

July Steel Exports, Imports Fall

FERROUS exports in July were down more than 46,000 net tons from June's total. Commerce Department figures show overseas shipments in July to be 460,979 tons, compared with 507,312 tons in June. A much greater drop resulted in imports. July's aggregate of 2214 tons was 16 per cent of June's 14,057 tons.

The totals and trends for the latest month are interesting because they were compiled for a month in which steel demand in the U. S. dipped to a low for the year. The Commerce figures for outgoing and incoming steel also declined. Import and export totals will bear watching in future months to see the effect on them of foreign currency devaluations.

Scrap exports climbed sharply to 187,511 tons in July from 54,725 tons a month earlier, showing effects of a slow domestic market. Imports also showed this trend by falling to 52,359 tons from 91,838 in June. The decline in scrap imports has been evident since the first of the year. Contracts for foreign scrap have not been renewed upon expiration and monthly shipments have dropped steadily from the 200,000 ton monthly average at the end of the first quarter. June and July iron and steel exports by principal categories were:

(Net Tons)

	June	July
Semifinished	53,426	59,200
Iron and steel bars	53,306	47,182
Sheet and plates	180,938	175,522
Structural shapes	61,861	35,453
Railroad supplies	36,387	21,477
Tubes, pipe, fittings	81,910	85,492
Wire products	33,539	32,684
Nails, other fasteners	5,945	3,969
Total	507,312	460,979
Pig iron, ferroalloys	13,893	3,111
Scrap	54,725	187,511

Commerce Department's breakdown of imports for July and June is:

(Net Tons)

	June	July
Ingots, etc.	5,545	.....
Wire rods	316	65
Iron bars, slabs	23	12
Reinforcing bars	95	200
Hollow bar, drill steel	1	.....
Other bars	86	65
Boiler, other plate	5,879	322
Sheets etc.	280	27
Tin plate etc.	.....	1
Other hoops, bands	.....	23
Structurals, piling	927	834
Rails, fastenings	9	66
Wheels, axles	.....	2
Pipe, tubes	476	240
Round wire	1	5
Flat wire strip	215	140
Telegraph wire	105	74
Wire rope	56	96
Nails, etc.	37	24
Bolts, nuts, rivets	3	6
Castings, forgings	3	7
Die blocks, blanks	.....	5
Total	14,057	2,214
Pig iron	213	.....
Sponge iron	255	.....
Ferromanganese	1,510	133
Ferrosilicon	84	29
Ferrochrome	84	195
Scrap	91,838	52,359

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Capitol observers wonder about apathy of "conservatives" toward "liberal" measures in Congress. Present situation is radically different from that of 10 or 15 years ago

WASHINGTON observers are puzzled over the apathy of "conservative" elements in the population toward "liberal" measures which have been, or are in process of being, enacted by Congress.

They have especially in mind the Reciprocal Trade Agreements Extension Act which went through Congress without a hitch and has been signed by the President, the Social Security Expansion bill which passed the House by an enormous majority, the antimerger bill which passed the House and now is approaching Senate action and the vote in both houses, now in conference, to increase the minimum wage to 75 cents.

Ten or fifteen years ago such measures would have made Washington come alive with people objecting to them or interested in having them modified. Observers interested in studying trends wonder just what the cause of the present complaisance is. Is it because the country is rich and prosperous, and people are comparatively uninterested in new "liberal" legislation? Is it that conservatives are shell-shocked by the continual barrage of liberal legislation of recent years, and have given up the fight? Or could it be that sentiment has changed, and that "liberal" legislation now is more widely supported?

Especially Noteworthy — Indifference of industry is especially noteworthy. Manufacturers used to flock to Washington in the old days to fight against legislation they considered undesirable. Today comparatively few of them come to Washington for that purpose. Those that do come usually have been invited or subpoenaed. Even large industry trade associations seem half-hearted in opposing legislation which, you would expect, their members do not favor.

Here is one illustration: Few manufacturers' organizations have a policy on the antimerger bill which, if passed, would narrow the market for businesses whose owners for one reason or another wished to sell out.

Whatever the reason for this attitude of indifference, one thing is certain—it plays into the hands of those who are not satisfied with what already has been done in the "liberal" direction but are intent on more and more political face-lifting.

Some of the legislation now being shaped up for next year's session of Congress is quite controversial. There is little doubt that it could be improved substantially if businessmen and industrialists felt a greater sense of responsibility.

Important Bills for Next Year—An important study is in progress over the old question of revising our laws to discourage monopoly. The veteran's pension increase bill again will be called up next year. The antimerger bill still is pending in the Senate. The Ways and Means Committee contemplates extensive changes in our tax system next year, with probable repeal or reduction of many excise taxes that are burdensome to industry. Other measures to be acted on next year are the omnibus ship subsidy bill, radical overhauling of our patent law, the national science foundation bill, the national health bill and, if unemployment again becomes serious, a bill which would give the government vast powers to finance and participate in industrial expansion.

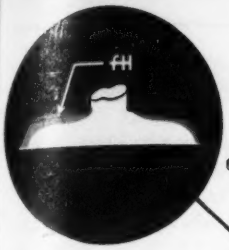
Businessmen will have an opportunity over the next six months to take a part in the formulation of legislation which will have an important bearing on our country's development. The big question is: How many will take advantage of it?

DEFENSE COMMITTEE: Defense Secretary Louis Johnson (standing) addresses the first meeting of the North Atlantic Pact Defense Committee. He is confident that the 12 pact nations will be able to avert war by building up their defenses. NEA photo

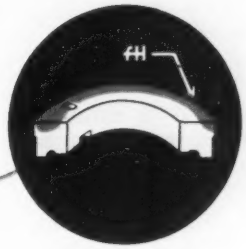
Cause of Strike Headaches

WHILE Taft-Hartley Act supporters in Congress are aware that failure to illegalize industry-wide and union-wide bargaining under that law is responsible for the present steel and coal strike headaches there probably will be no attempt either at this or next year's session to correct that omission. Prevailing disposition is to leave it to the President to handle these strikes, and reserve new congressional labor legislation until after the results of the 1950 elections have become known.

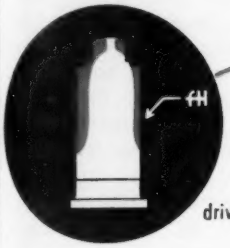
A strong Taft-Hartley Act supporter who lost his seat in Congress last November because of union opposition analyzes prospects this way: "If Taft is defeated next year as a result of the strong campaign the unions are organizing against him—and you must remember that Taft came through with a very narrow margin last time without such opposition—it will be five or ten years at least before any Congress will



oil pump valve

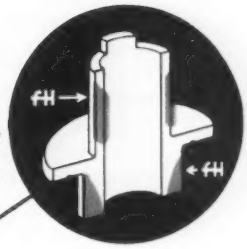


clutch adjusting nut



drive shaft

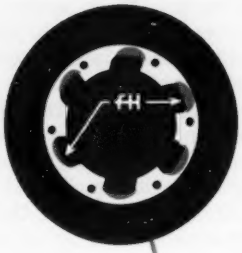
torque converter hub

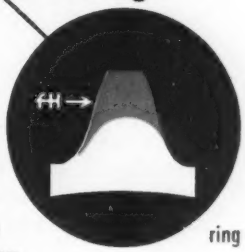


fh the new symbol

for faster, more economical surface hardening

torque converter internal cam





ring gear

On your part prints or assembly drawings . . . wherever you want to specify hardness values and patterns **and be sure of getting them** . . . write "fh." It's the new symbol for "flamatic hardened"—the term that made hot news at the last two Metal Shows with starter ring gears and torque transmission cams held to closer specs at higher speeds than ever before.

At this year's Metal Show, flamatic hardening, with electronic control, does it again, demonstrating in actual production how "fh" puts the right hardness in the right place in pipe wrench jaws—and opens up a promising new field of applications. **By all means,** see the Flamatic demonstration at the Metals Show. Or write for new booklet on how Flamatic hardening makes better products **cost less.**

Booth 1826
ional Metal Show
October 17-21

hook roller

©

flamatic

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio, U.S.A. • CINCINNATI

vote to destroy national labor union monopoly."

Training Given in Warehousing

IF YOU are interested in enrolling selected employees in the warehousing course again offered by the Munitions Board, write to the chief of the Storage Division, Munitions Board, 2E825 Pentagon building, Washington 25.

The course will be conducted late in October and in November at various military depots and warehouses throughout the country. Purpose is to acquaint private industry with stock control and other procedures, and with the various problems incidental to military warehousing, so that the armed services can benefit from more understanding co-operation in the event of war. Another object is to create a reservoir of trained men capable of manning military warehousing jobs in time of war. The course has been organized for completion in a single week.

British Take Ideas Home

PROOF that British productivity teams visiting the United States under Economic Cooperation Administration sponsorship have taken home many ideas for increasing British industrial efficiency is afforded by the first report to be compiled by such a group.

Written by the team representing the steel foundry industry, this report fills 108 printed pages crammed with leads on how British steel founders may increase their productivity. It is richly illustrated with photographs, drawings and statistical tables.

Highlights are the findings that productivity in United States steel foundries is 50 to 90 per cent greater than in British foundries, and that average man-year production in seven United States foundries is 19.34 tons of castings compared with 11.47 tons in seven British plants.

Copies of the book can be obtained from Economic Cooperation Administration, 800 Connecticut Ave. N. W., Washington.

Welding? Watch Ship Study

SHIP STRUCTURE Committee's program to develop safe, all-welded steel ships has become a very comprehensive one in the metallurgical research field. Results should be widely useful to fabricators of welded steel products.

The program includes basic research to determine nature and characteristics of the transition temperature phenomenon. It is aimed at removal of uncertainty about the reproducibility and reliability of the various tests to determine transition temperature and at the ultimate setting up of acceptable specification standards. It also includes identification of steelmaking practices and chemical analyses capable of exercising significant influence on transition temperature. The latter study includes preparation of an integrated survey of all significant data relating to notch bar testing, and the reanalysis of all data to determine relationship between elastic strain energy and stress with reference to the change from ductile to brittle behavior.

Fish Story

THIS fish story may be true. A German inventor of an electrical device for catching fish commercially has affidavits supporting it.

Office of International Trade has published a description of a product consisting of two electrodes to which is applied an adjustable voltage. Any fish which enters the electrical field is allegedly forced to head toward the positive electrode. Then, the varying voltage is supposed to cause the fish's tail muscles to contract and relax, thus moving the tail and propelling the fish toward the positive electrode where a net is placed. German fisheries experts who have examined the device have registered their approval.

In Field of Fabrication—The committee seeks to determine causes of the lowered ductility of welded structures as compared to unwelded members, particularly at lower operating temperatures. This includes studies of the relative notch ductility of the various zones across a weld, and of the initiation and propagation of cracks in weldments and related phenomena. Of immediate interest is development of a notch sensitivity test that will give fast and accurate results; to this end Charpy test results are being studied with a view to getting an acceptable pattern with fewer tests than now required.

Institutions conducting research on one or more phases of the overall metallurgical program are Swarthmore, Case, Battelle, Massachusetts Institute of Technology, University of Pennsylvania, New York Naval Ship Yard, National Bureau of Standards, Princeton, David Taylor Model Basin, Watertown Arsenal, Carnegie Institute of Technology. Supervising these studies is the National Research Council's Committee on Ship Steel: Chairman, Dr. Robert F. Mehl, Carnegie Institute of Technology; vice chairman, Dr. C. H. Herty Jr., Bethlehem Steel Co.; technical director, Dr. Finn Jonassen, National Research Council.

Comprehensive Ship Design Research—Also under way is a comprehensive research program on ship design.

Composed of representatives of the Army, Navy, Coast Guard, Maritime Commission, and American Bureau of Shipping, the Ship Structure Committee is successor to the board created by the secretary of the Navy during the war to investigate cause of fractures in welded steel merchant vessels.

This study revealed that welded ship fractures in all cases resulted from notches and have occurred in notch sensitive steel. As a result, hatch corners were redesigned to alleviate notches, and riveted seams placed longitudinally in hulls or decks or both. These seams have proved to be good "crack arresters" but the objective is to eliminate all tendency to crack.

Several years probably will be required to carry the research program to consummation, says Comdr. R. D. Schmidtman, United States Coast Guard, secretary of the Ship Structure Committee.

Want To Do AEC Business?

HOW TO DO business with the Atomic Energy Commission is told in a new booklet available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, at 10 cents a copy.

Its title is "U. S. Atomic Energy Commission Contracting and Purchasing Officers and Types of Commodities Purchased." It answers these questions: What is bought by the AEC? Who buys it? Where are the procurement offices located?

The booklet is designed particularly for the use of small business firms.

Public Construction Budget

INTERESTED in public construction projects? You will find in the Congressional Record of Wednesday, Oct. 5, pages 14118-14124 amounts agreed on by House and Senate conferees for projects to be carried on by the Army Corps of Engineers during the current fiscal year. Total provided is $664,178,190, compared with the budget request of $772,458,220.

Cartel Talk Mounts in Western Europe

Pressure for trusts in steel and steel products heightened by economic disclocations stemming from currency devaluations. No important cartels yet formed

PRESSURE to form cartels in Western Europe is increasing. Talk of monopoly in steel and steel products is spurred by the economic dislocations stemming from currency devaluations.

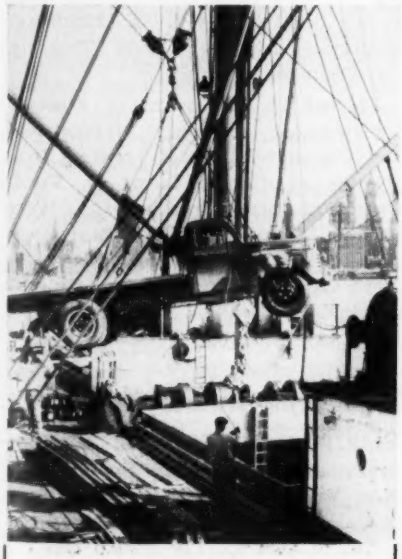
No important cartels have yet been created because of American objections, but European proponents will soon be trekking to this country to drum up approval. One of the most ambitious cartel projects since the war—for steel wire products—was actually put into operation by the British and Belgians, but it collapsed since Western Germany could not enter. U. S. officials have thus far curbed such trusts through their voice in the control of Germany; no major cartel could survive without the Ruhr participating.

Western Germany Crucial—Western Germany, then, is the key nation in the cartel question. Proponents of monopoly in other Western European countries have redoubled their efforts to bring the new German goverment at Bonn into the fold in the hope that Bonn might influence the Americans to modify their attitude toward the problem. Bonn officials are still predominantly anticartel.

Industrialists favoring trusts argue this way: Cartels are necessary as an interim measure to cushion the shock when the Marshall Plan ends in 1952. Despite the great benefits of ERP, European industry is still far behind the U. S. technologically and will be for some years to come. Cartels are like tariff walls to protect weak European industry until it can stand on its own feet to face U. S. competition.

Many Oppose Cartels—Many European business men—particularly steel consumers—strongly oppose cartels. They argue this way: Cartels artificially prop prices, discourage modernization, support the high cost producers, make prohibitive the investment of U. S. capital in Europe's industry. One reason why Europe is behind the U. S. technologically is because status quo conditions in industry were encouraged by prewar trusts. Let the inefficient operations die. Western Europe will benefit, not lose, from such deaths, just as the U. S. has gained.

One place where the whole matter will be thrashed out is before the International Ruhr Authority, the majority of whose membership will probably favor the cartel idea. French, Belgian, Luxemburgian, British and German members are all likely to be trust adherents. Only the influential U. S. representatives on this board, which has general supervisory powers over Ruhr industry, will probably oppose.



TRUCKS FOR ISRAEL: Part of the first major shipment of automotive products destined to ease the transportation shortage in Israel is lowered into the hold of the S. S. *Expediter* in New York. NEA photo

Need Ruhr Expansion in Coal

Custodians of the Ruhr coal mining industry—who face the knotty problem of regrouping German coal properties among about 12 new companies—estimate that a $725 million expansion and modernization program is essential. About $300 million of this could be financed by the mines themselves; the rest would have to be supplied from counterpart funds and outside private capital. This expansion program would include construction of homes for miners and erection of gigantic power plants on mine sites to utilize low-grade coal.

The last stockholders' meeting has been held of Vereinigte Stahlwerke, once the largest steel corporation in Europe. The company is being liquidated, and its few remaining units will be redistributed among newly formed companies, in accordance with Allied directives.

Production of the Volkswagen car will soon reach a daily high of 200 units, mostly of the more expensive and better finished export model now available for domestic buyers too. The company has spent $360,000 for repairs since the war; all of this was financed from current profits. Once owned by the Nazi Labor Front under Robert Ley, the firm has been turned over by British custodians to the new German government who will hold it in trusteeship. It will be a public enterprise for the present, but no changes in management will occur.

U. K. Labor Deliberates

The British Trade Union Congress is still deliberating on its stand regarding devaluation and wages. Half of the 8 million workers it represents had pressed for wage boosts even before the devaluation.

The thorny dilemma TUC faces is this: How to appease its rank and file but still hew to the Labor government's wage stabilization policy? The group seeks some formula for raising the income of low-paid workers which is agreeable to workers and the government. Complicating the issue is the problem of seniority and craftsmanship. Rates are figured on these two factors to a greater extent than in the U. S. Any wage grant to low-scale workers might upset the delicate balance established for men with longer longevity or higher skills.

Britain has established world leadership in jet-powered transport planes, but U. S. aircraft companies have more experience in the design and development of rocket and jet propelled military aircraft types, a survey by Aircraft Industries Association discloses. In both the U. S. and Britain, jet aircraft developed are mostly experimental. Relatively few have been produced in quantity yet.

Because of the importance of dollar exports, organizers of the British Industries Fair are increasing the circulation of the London and Birmingham sections of the 1950 BIF catalog and diverting extra supplies to North American markets. Bulk distribution will take place in February so that overseas trade buyers—particularly American—will be able to plan their tour of the fair in advance.

Economic Crisis in France

Collapse of the Queuille cabinet was more than just another somersault in the French political circus. The ministerial crisis is largely an expression of threatening social crisis which has been smoldering beneath

the calm surface France has presented for nearly a year.

The French, despite rising production, have been experiencing a living standard lower than before the war. Moderate labor leaders have urged that workers should wait for prices to come down, should not demand wage increases. The cost of living did decline slightly until August, but now it's climbing again. This fact, plus devaluation, has exploded the calm. A new French government must tackle the problem. The Queuille ministers could not agree on the solution.

Hungary Drafts Five-Year Plan

A new five-year plan of development is being drafted by Hungary. On completion, the country's economy is supposed to be transformed from a mainly agricultural condition to one predominantly industrial. The plan foresees an increase of ingot steel output from the present 800,000 tons per year to 1.5 million tons in 1954. Production of pig iron would be boosted from 375,000 tons annually to 920,000 tons. This will necessitate construction of a new plant at Mohacs on the Danube and will include a coking facility.

Roumania Programs Expansion

Plans are being considered to increase Roumanian iron and steel production by reconstructing and modernizing the three existing blast furnaces and the 12 open-hearth furnaces. Two additional open hearths will be built, and an expansion of coking plant capacity is provided.

Turkey Seeks U. S. Loan

International Bank for Reconstruction & Development has sent a five-man mission to Turkey to examine three projects for which Turkey is seeking a loan. The projects are grain storage facilities; irrigation, flood control and electric power; and port construction and improvement.

New Bridge on Old Piers

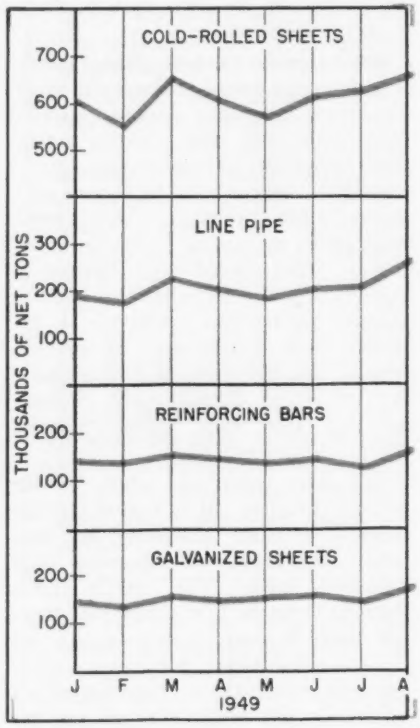
UNUSUAL feature of a construction project awarded to U. S. Steel's American Bridge Co. is to erect a new bridge alongside present spans and then move it onto the old piers.

Illinois Central Railroad awarded the contract for replacement of the old IC bridge which for 60 years has spanned the Ohio river at Cairo, Ill. When construction of each span is completed, the corresponding span of the old bridge will be cut free and the new section rolled into place. Old spans will be launched like a ship into the river. Individual spans, some longer than a football field, will be cut into scrap.

New Records for Year

Mill distribution of four steel products rises to 1949 peaks as pattern of demand shifts

NEW HIGH monthly levels for 1949 were set in August in mill distribution of four classes of finished steel products—cold-rolled sheets, line pipe, reinforcing bars, and galvanized sheets. Trends of these products this year are shown in the accompanying chart.



The 1949 monthly high of 658,522 net tons of cold-rolled sheets results largely from increased shipments to the booming automobile industry and helps put total distribution of that product in the first eight months of the year above that of any other product. The eight-month total of 4,881,045 tons of cold-rolled sheets constitutes 11.33 per cent of the 43,082,387 tons of all products distributed, the American Iron & Steel Institute reports. This was the first time this year the cumulative total for any product exceeded that of hot-rolled bars (including light shapes). Distribution of hot-rolled bars and light shapes through August totals 4,852,884 tons, or 11.26 per cent of all steel products shipped from mills.

Three-months Uptrend — Second highest monthly distribution of cold-rolled sheets was 649,701 tons in March. Distribution fluctuated during the first five months of the year and climbed in June, July and August.

Year's high point in line pipe distributed reflects high level of activity in installation of transmission lines for oil and gas, particularly the latter. This high point, established in August, is 259,060 tons. Previous high for the year was 228,310 tons in March. Line pipe shipped by mills in the first eight months totals 1,655,944, equivalent to 3.8 per cent of all steel shipped by mills in that period.

Reflects Construction Pace — The year's new monthly high level set in August by shipments of reinforcing bars is a result of the heavy volume of construction under way. August shipments of reinforcing bars totaling 155,662 tons bring the eight-months aggregate to 1,114,943 tons. Previous high month of the year was March with 150,230 tons.

The distribution of galvanized sheet reached the year's new monthly high of 174,088 tons in August largely because of the government's grain bin program. This tonnage represents 3.5 per cent of the total of 4,918,314 tons of all finished steel distributed by mills in August. Previous high month of the year was June with 158,401 tons. Mill shipments of galvanized sheets in the first eight months of this year total 1,195,114 tons.

Metal Treaters Elect Officers

OFFICERS elected for the coming year by Metal Treating Institute at its 17th annual meeting in Cleveland, Oct. 14-16, are: President, Fred Heinzelman Jr., Fred Heinzelman & Sons, New York; and vice president, Paul Seitz, Commercial Steel Treating Co., Cleveland. Retiring president of the institute is L. A. Lindberg, chairman, Lindberg Steel Treating Co., Chicago.

Elected to the board of trustees for two-year terms are: Michael Kober, Commercial Metal Treating Inc., Bridgeport, Conn.; Lloyd G. Field, Greenman Steel Treating Co., Worcester, Mass.; and C. Robert Derhammer, Lakeside Steel Improvement Co., Cleveland. Next meeting of the institute will be at French Lick, Ind., May 1-3, 1950.

Engineering Awards Made

ELECTION of Walter H. Aldridge, president, Texas Gulf Sulphur Co. New York, to receive the John Fritz medal for 1949 is announced by the board of award. The award was established in 1902 and is jointly sponsored by the Founder Societies of civil, mining, mechanical and electrical engineers. It is presented not more often than once a year for scientific or industrial achievement in any field of pure or applied science. Previous winners include: Alexander

Graham Bell, Edison, Orville Wright, Marconi, Sperry, Hoover, Kettering.

Recipient of the Daniel Guggenheim medal and certificate for 1950 is Dr. Edward P. Warner. He is president of the Interim Council of Provisional International Civil Aviation Organization and has held many government posts in the aeronautical field. The award, created to honor persons making notable achievements in advancement of aeronautics, has been won by Orville Wright, Boeing, Douglas, Martin, Doolittle, Bell, Grumman.

Industry Theme: Cut Costs

Industrial Research Institute, management association, tool engineers tackle problem

MANAGEMENT must find the means to counteract today's high costs of operation. This is the increasingly predominant theme wherever metalworking executives meet.

The Industrial Research Institute was told last week that one approach to the problem is through development of new products. American Management Association is sponsoring a meeting in Chicago Nov. 10 and 11 to consider means of reducing production costs in industry. American Society of Tool Engineers will hold an industrial exposition on cost-cutting next Apr. 10-14, in Philadelphia.

New Product Flow Vital

One of management's pressing problems is new products, the Industrial Research Institute heard Oct. 12. Maurice Holland, industrial research adviser, said the problem calls for integration of laboratory research, executive brains and salesmen's ideas to produce new industrial products and to maintain a continuous flow of new product ideas.

In reviewing the strength and weakness of the current industrial research setup in the United States, Mr. Holland reported that a survey indicates gearing of research to sales is either proceeding too slowly or not receiving concentrated attention to meet present needs. While research rates high with manufacturers, some of them are too impatient to get products on the market. Top management must devote more time and study to research, Mr. Holland said, for this phase of business is as important as sales and production.

AMA Cost-Reduction Forum

About 1000 production executives are expected to attend American Management Association's cost-reduction meeting Nov. 10 and 11.

Six sessions of the conference, to be held at the Palmer House in Chicago, will be devoted to cost reduction from the standpoint of improving shop practice, equipment policy, production control, mechanized inventory, determination of direct and indirect costs, employee incentives and other aspects of commonly encountered production problems.

Tool Engineers Tackle Costs

High labor cost is not the sole obstacle to reduction of manufacturing costs, American Society of Tool Engineers believes.

Two other stumbling blocks are: Lack of information in industry as to what is available in new cost-cutting methods and equipment, and a shortage of competent sales engineers to tell the story to industry. As one step to overcome these problems, the society will conduct an industrial exposition of new cost-cutting methods and equipment next April. The show will be especially designed for the smaller companies, on the theory that most large organizations are already fairly familiar with developments in this field.

NSIA Elects Officers, Trustees

ELECTED at the sixth annual meeting of the National Security Industrial Association were: Chairman of the board, Frank M. Folsom, president of Radio Corp. of America; president, James R. MacDonald, first vice president of General Cable Corp.

National vice presidents are: Earle W. Mills, executive vice president of Foster Wheeler Corp.; J. J. McDonnell, president of McDonnell Aircraft Corp.; and Harold Boeschenstein, president of Owens-Corning Fiberglas Corp.

Homer H. Ewing of the development department of E. I. du Pont de Nemours & Co. Inc. was elected secretary. John M. Fisher, vice president and treasurer of Standard Brands Inc., was elected treasurer. R. C. Simmons, general manager of the government department of Johns-Manville Sales Corp., was elected assistant secretary-treasurer.

Trustees for three-year terms expiring September, 1952, are:

George W. Codrington, vice president, General Motors Corp.; Frank M. Folsom; Walter Geist, president, Allis-Chalmers Mfg. Co.; P. Ralph Mork, executive vice president, Crane Co.; and C. J. O'Connor, president, Reichhold Chemicals Inc.—all of whom were re-elected. John M. Fisher; Howard B. Fonda, senior vice president, Burroughs Wellcome & Co. (U. S. A.) Inc.; Don G. Mitchell, president, Sylvania Electric Products Inc.; R. L. Maxwell, vice president, American Machine & Foundry Co.; H. F. Fischbach, president, Fischbach & Moore Inc.; W. H. Swigert, president, Pacific Bridge Co.; Graham H. Anthony, chairman, Colt's Mfg. Co.; H. C. Turner Jr., president, Turner Construction Co.; C. C. Pearson, president, Glenn L. Martin Co.; and Thomas J. Watson Jr., vice president, International Business Machines Corp.

Trustees for two-year terms expiring September, 1951, are Earle W. Mills and A. M. Wibel, vice president, Nash-Kelvinator Corp.

Trustee for a one-year term expiring September, 1950, is R. A. O'Connor, president, Magnavox Co.

CALENDAR OF MEETINGS

Oct. 17-20, American Gas Association: Convention at Hotels Morrison, Palmer and Sherman, Chicago.

Oct. 17-20, Wire Association: Annual convention, LaSalle Hotel, Chicago. Association headquarters are at 300 Main St., Stamford, Conn.

Oct. 17-21, 31st Annual National Metal Congress and Exposition: Sponsoring societies are: **American Society for Metals, American Welding Society, Metals Branch of the American Institute of Mining and Metallurgical Engineers and Society for Nondestructive Testing.** Public Auditorium, Cleveland. Secretary of American Society for Metals is W. H. Eisenman whose headquarters are at 7301 Euclid Ave., Cleveland 3.

Oct. 17-21, American Institute of Electrical Engineers: Annual fall general meeting, at Netherlands Plaza Hotel, Cincinnati. Institute headquarters are at 33 W. 39th St., New York.

Oct. 23-26, National Institute of Governmental Purchasing: Meeting, Hotel Cleveland, Cleveland.

Oct. 24-25, National Association of Suggestion Systems: National fall conference, Hotel Statler, Cleveland. Headquarters are at 122 S. Michigan Ave., Chicago 3.

Oct. 24-28, National Safety Council: National safety congress and exposition, Stevens, Congress and Morrison hotels, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 26, American Iron & Steel Institute: Fourth regional technical meeting, Hotel Thomas Jefferson, Birmingham.

Oct. 26-27, National Conference on Industrial Hydraulics: Sheraton Hotel, Chicago. For details, write Otto J. Maha, Hannifin Corp., Chicago.

Oct. 26-28, National Metal Trades Association: 1949 convention, Palmer House, Chicago. Headquarters are at 122 S. Michigan Ave., Chicago 3.

Oct. 27-28, Porcelain Enamel Institute: 18th annual meeting, French Lick Springs Hotel, French Lick, Ind. Headquarters are at 1010 Vermont Ave., Washington 5.

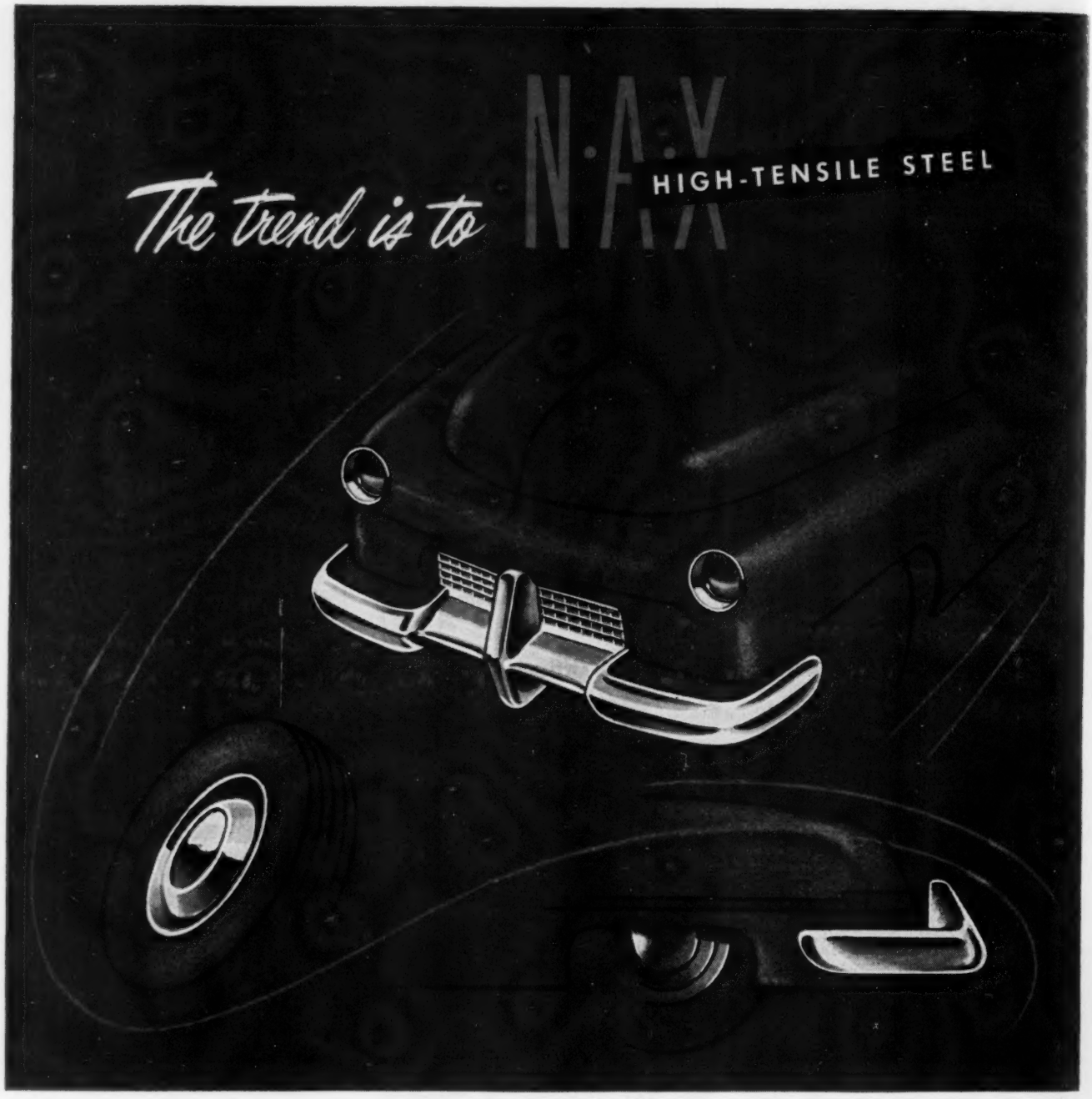
Oct. 28, Illinois Mining Institute: 57th annual meeting, Hotel Abraham Lincoln, Springfield, Ill. Institute headquarters are at 28 E. Jackson Blvd., Chicago.

Oct. 30-Nov. 2, National Tool & Die Manufacturers Association: Annual meeting, Hotel Statler, New York. Association headquarters are at 1412 Union Commerce Bldg., Cleveland.

Oct. 31—Nov. 1, American Machine Tool Distributors' Association: 25th anniversary meeting and banquet, Hotel Gibson, Cincinnati. Office of the secretary is at 505 Arch St., Philadelphia 6.

Nov. 1-5, Pacific Chemical Exposition and Pacific Industrial Conferences: Running concurrently at San Francisco Civic Auditorium.

Nov. 2, American Iron & Steel Institute: Fifth regional technical meeting, at the Waldorf-Astoria, New York.



Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

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N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950

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Unit of National Steel Corporation

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Ford announces its new automatic transmission. Both Ford and Borg-Warner tooling up to produce it. Price to be not over $150

DETROIT

FORD has taken the wraps off its new automatic transmission. The unveiling climaxes four years of continuous experiment and test, during which time dozens of different designs were put through their paces.

Developed in co-operation with engineers of Borg-Warner Corp., Muncie, Ind., under general supervision of Harold T. Youngren, Ford vice president and director of engineering, the device combines a single-stage torque converter with multiplication factor of over 2 to 1 and a three-speed planetary gear train. Tooling for production is now going ahead by both Ford and Borg-Warner but the first units will not be available for installation on Ford and Mercury models before next summer. Price: Not over $150.

Three Elements—The torque converter comprises three bladed elements—a drive or pump member, the output or turbo member, and a reactor member which at a certain speed is locked out of action, making a fluid coupling out of the converter. Pump and turbine are of stamped steel sections, how assembled Ford will not say as yet, but it is likely they are mechanically locked and either welded or hydrogen brazed. Reactor is of die-cast aluminum. All three are contained in a cast aluminum inner housing, suitably finned for air cooling. An outer housing is of cast iron, with ports allowing circulation of air around the inner housing, thereby dispensing with the need for oil cooling which is standard on other types of automatic drives.

Gear Sets Simplified—Hydraulically operated gearbox, working in conjunction with the converter, comprises two input sun gears, an output ring gear and the necessary meshing pinions to form a three-speed and reverse gear set operated by two bands and two multiple-disk clutches through a valve body and speed-conscious governor. One of the clutches is constantly engaged during all forward driving. Patterned after the GM Hydra-Matic drive, the gear sets are simplified: Two planetary units are used against three in the Hydra-Matic.

Selector quadrant on the steering wheel has five positions, from left to right: P, R, N, DR and LO (Parking, Reverse, Neutral, Driving Range and Low Range.) This differs from other selectors in that the shift from reverse to driving range is through neutral, facilitating parking and rocking of the car to pull out of ruts or snow. The car is held firmly in parking position by engagement of a series of dogs on a ring gear, eliminating danger of breakage occasionally encountered in use of a pawl.

How It Works—Starting ordinarily is done automatically in the intermediate gear range, 1½ to 1, assisted by the torque converter which has ratio of better than 2 to 1, or the equivalent of 3 to 1 overall ratio. Automatic changeover to top gear is obtained anywhere from 15 to 60 mph, depending upon the throttle setting. Thus, only one automatic shift is used, but it is still possible to slow the engine down by the use of low rear axle gear ratio (a little over 3 to 1) so that engine speeds are practically equivalent to overdrive in the top or cruising gear. A shift down to intermediate gear is possible at any time below 50 mph to give a step-down of 1½ to 1 for acceleration or hill climbing, by depression of the accelerator pedal. Low gear of approximately 2½ to 1 is reserved for exceptional performance requirements and where heavy gradients are encountered, or for down-hill braking. Engine may be started by pushing the car up to a speed of 15-20 mph.

Expect Wide Acceptance — Both Ford and the Warner gear division of Borg-Warner are tooling for making the transmission, indicating that a high degree of acceptance is expected from Ford and Mercury buyers. The question of whose transmission it is will have to wait for future determination as the Ford and B-W interests are pretty thoroughly tangled right now. At any rate, Mr. Youngren believes "we have gone a long way in this design to put what we consider a 'no compromise' transmission in the hands of the public at a reasonable price."

PARIS AUTO SHOW: The 36th Paris International Auto Show ends this week at the Grand Palais Exhibition Hall. General view shows a wide variety of new models. The ten-day show exhibited cars manufactured in practically every country of the world. NEA photo

Loan Arouses Auto Industry

APPROVAL of the $34.4 million RFC loan for Kaiser-Frazer, to bolster working capital and provide funds for tooling several new lines of passenger cars, touched off a barrage of speculation around Detroit.

Stockholders of General Motors, Chrysler and other motor companies,

after thinking the matter through, wonder whether they, as taxpayers, are not actually subsidizing their competition. Here they reason, is a substantial chunk of public funds being dished out to permit a competitor to obtain machinery and tools to build a new product which, if it is to sell at all, will have to draw customers who might otherwise buy a different make.

Even employees of the old-line companies are scratching their heads and wondering if they, again as taxpayers, are not actually subsidizing jobs for several thousand people, perhaps at the expense of their own future security.

Three Cheers—Cheers resounded at Willow Run as news of Henry J.'s success at Washington filtered through. He had even secretly taken a mockup of one of the new models with him, to impress the loan agency officials. No one, however, seriously thought he would be turned down. For one thing he had played ball with the CIO in granting the 10-cent pension package for his Fontana steelworkers, and he has returned a few million of his $90 million RFC loan on the California steel plant.

But this new kind of financing doesn't ring true in the motor industry's thinking. Opinions are voiced to the effect that when a company needs money the usual recourse is to bank loans or stock issues which are not difficult to arrange if the credit risk is good. Of course, K-F has done this in the past, the most recent step being a $25 million line of credit negotiated with the Bank of America and the Mellon National Bank. Now it is assumed the RFC funds will be used in part to retire any of this credit which has been used. The company has issued no details of any breakdown of the $34.4 million, although in Washington it was indicated $4.4 million would be used for tools to produce a proposed new smaller car, $18 million for retooling medium and higher-priced models, and $12 million for working capital. The loan is on a ten-year basis, with interest rate 4 per cent, not exactly cheap capital.

Pledges Widespread Assets — The loan is being secured by pledging of the widespread Kaiser assets in a number of other companies, such as Permanente Metals, etc., and by a mortgage on both the Willow Run plant, and the new tools and equipment. As for the plant, K-F has paid only $1,510,000, or 10 per cent of the agreed purchase price, to the War Assets Administration, so it will be another nine years before that debt is erased. The WAA is said to have revised its sale agreement so it will have a mortgage secondary to that of the RFC.

When news of the loan became public, K-F stock promptly jumped from 4 to 5⅜.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,996
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	647,000*	437,181
October	.....	516,814
November	.....	495,488
December	.....	514,337
12 mos.	.....	5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Sept. 24	158,007	98,394
Oct. 1	151,593	121,475
Oct. 8	148,072	119,398
Oct. 15	145,000	123,185

Estimates by Ward's Automotive Reports

Look to K-F for Business

Tool, die and machinery men lost no time in beating a path to the K-F purchasing department, once they realized the government dough would be ready to lay on the line. Although mockups of the new smaller car had been completed in plants of the Budd Co., little had been done in the way of actual placing of tool and die business. Six months probably will be required to push through such a program, so it is not likely the new Kaiser will be on the market before next April, if then.

Kaiser: RFC's Biggest Debtor

Figuring in the Fontana deal, the latest loans would put Kaiser about $140 million into the RFC till, making him its largest single debtor. Total RFC outlays to all industry are said to be on the order of $450 million. Of course, the K-F loan looks pretty sound in view of the profitable position of many of his enterprises. Permanente Metals, for example, has always done well and, according to recent comment by a leading investors' service, has been guaranteed orders for 40 per cent of all aluminum to be stockpiled by Metals Reserve Corp. in the next 25 years. Permanente Cement also has been well into the black ink, and, except for this year, the Willow Run auto plant has made good money. It lost $8.1 million in the first six months of this year, but earned $10.4 million in 1948, about $19 million in 1947.

RFC Help for K-F Dealers?

Next caper in the RFC-Kaiser picture is understood to be a further $15 million loan to dealers to help them finance cars between the factory and the ultimate purchaser. This is another new twist, other dealers being required to handle such financing through conventional types of commercial paper. The facetious comment that the next step will be RFC loans to car buyers must be brushed aside.

Pontiac Moves Up Preview

PRESS PREVIEW of 1950 Pontiac models will be held Nov. 10, and details of the new line will be announced publicly Nov. 27. These dates have been moved ahead from original planning, possibly because of the steel strike but more probably because the 1949 schedules were run off on time, with none of the delays encountered a year ago. Changes are not expected to be numerous, the present body types carrying through another year. Grilles and decorative treatment will be restyled. You can also look for an increase in engine displacement to provide added power.

Packard President Resigns

RESIGNATION of George T. Christopher as president of Packard, effective Dec. 31, occasioned no surprise to those who had talked with him in recent months. In the past 15 years, he has brought the company to the pinnacle of its 50-year history, and during the war years directed a superb job of aircraft engine production.

Packard production this year will top all past records and the plant and dealer organization is there to turn out 200,000 units a year.

Although only 62, Mr. Christopher doubtless feels the time to leave is when things are at the top, for the ride down the next few years may be a rough one for everybody, including Packard. Sixty-four-year-old Hugh Ferry, secretary and treasurer, has been named executive vice president and will work closely with Mr. Christopher over the next couple of months as he cleans his desk and prepares to focus his attention on what can be accomplished by further mechanization of his 750-acre "garden plot" at Tipp City, O.

Nothing Rolls Like a Ball

You couldn't buy
a better bearing!

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

BUYING...

. . . Rome Cable Exercises Option

Rome Cable Corp., Rome, N. Y., has exercised an option to acquire assets of Andersen-Carlson Mfg. Co., Torrance, Calif.

H. T. Dyett, chairman of the board of Rome Cable, says the transaction will be completed shortly after Jan. 1, 1950. Rome Cable will acquire Andersen-Carlson assets through an exchange of certain shares of Rome Cable common stock and will assume the California firm's liabilities. Rome Cable has been selling Andersen-Carlson's output since 1948.

BOUGHT...

. . . Interlake Chemical Sold

President E. L. Clair of Interlake Iron Corp., Cleveland, says his company has taken over activities and facilities of Interlake Chemical Corp., Cleveland.

The coal tar chemicals and synthetic and plastic resins business of Interlake Chemical will be continued by Coal Chemicals Division of Interlake Iron.

. . . Van Auken Purchased

Purchase of Van Auken Inc., Ferndale, Mich., by Penn-Ohio Steel Corp., Birdsboro, Pa., will involve operation of Van Auken as a subsidiary of Penn-Ohio Steel. J. B. Montgomery, former president of Empire Steel Corp., Mansfield, O., becomes president of Van Auken.

The all-cash transaction includes the Van Auken plants in Detroit and Mt. Clemens, Mich., which manufacture automobile radiators and bumper guards. Plans are being made to move Van Auken facilities to Birdsboro.

. . . Shook Bronze Bought Out

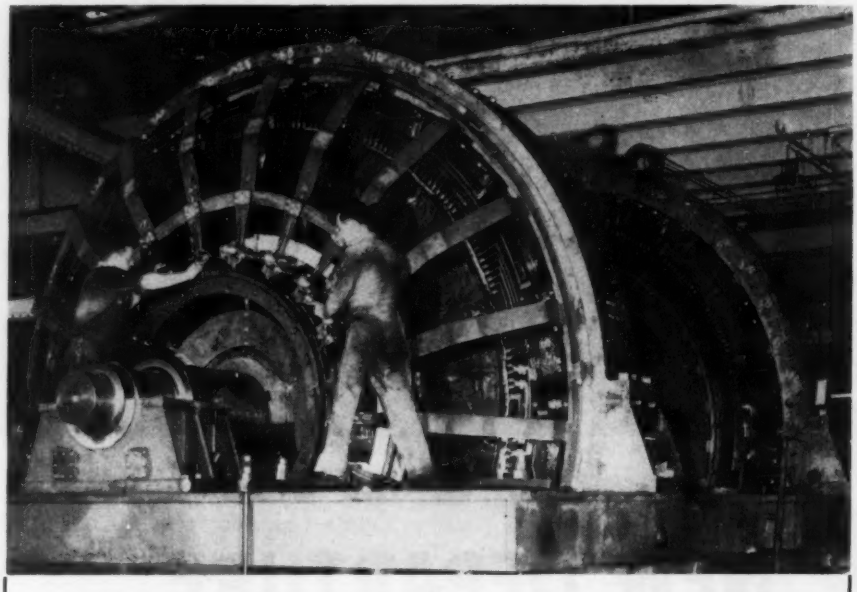
Randall Graphite Bearings Inc. purchased the foundry and machine shop of Shook Bronze Corp., Lima, O. Randall will move its Chicago plant to Lima.

Production at the Lima plant, presently to be known as Shook Bronze Division of Randall Graphite Bearings, was begun Oct. 10. For over 30 years Randall has handled its line of patented oil reservoir graphited bronze bearings and allied products. The Shook foundry was thoroughly modernized in 1946.

. . . Baldwin Buys Defiance Presses

In still another industry alignment Baldwin Locomotive Works, Philadelphia, bought the press business of Defiance Machine Works Inc., Defiance, O.

Purchase includes all models of Defiance preform presses which will be manufactured under the Baldwin-Defiance name at the Baldwin Eddystone, Pa., plant. Primary object of the purchase was to acquire an established line of small mechanical presses to supplement the existing line of Baldwin presses to offer better service to the plastics industry. Defiance Machine Works next year observes its 100th anniversary as a manufacturer of production machinery.



FOR KAISER IN FONTANA: Two huge drive motors to be installed at Kaiser Steel plant in Fontana, Calif., are tested at the General Electric Co., Schenectady, N. Y. They will be added to an existing roughing mill of the first continuous hot strip mill on the Pacific Coast. NEA photo

BUILDING...

. . . New Wrinkle Pilot Plant

New Wrinkle Inc., Chicago, is completing equipment for its new pilot plant at Dayton, O., for production of basic vehicles used in manufacture of Wrinkle finishes. Construction might permit acceptance of orders for shipment as early as Jan. 1, 1950.

Through use of these new products, the industrial finishes manufacturer will be able to produce uniform Wrinkles without further cooking at its plant. Manufacturer will need only to add dryers and pigments, then package the ready-to-use product. Inherent characteristic of Wrinkle finishes lies in the drying: As the surface of the finish on, say aluminum castings, dries, it results in a softer portion underneath; as drying is completed, the surface expands and causes folds according to a definite pattern.

BUILT.....

. . . By-Product Coke Ovens

Complete rebuilding from the ground up of its No. 4 battery of 58 by-product coke ovens at a cost of $1,150,000 has been accomplished by Woodward Iron Co., Birmingham. Actual time to rebuild was a little under 12 months. The battery was built in 1917 and had been in operation continuously for over 30 years.

. . . Clark Completes Factory

Entirely new factory at Jackson, Mich., has been completed by Clark Equipment Co., manufacturer of materials handling and automotive and street railway equipment.

New plant will bring production of Clark's line of transmissions, farm tractor drives, gears and forgings under one roof. The building was a major undertaking in the company's overall expansion program. Executive offices of the company are at Buchanan, Mich.

. . . Patterson Opens Plant

Patterson Foundry & Machine Co., East Liverpool, O., opened its new plant at Toronto, Ont., erected for the company's subsidiary, Patterson Foundry & Machine Co. (Canada) Ltd.

New plant has a floor area of 25,000 sq ft and is fully equipped to manufacture the company's complete line of industrial processing machinery and equipment. Besides these facilities the plant will maintain a process engineering division for design of complete or partial process systems and will assist research staffs of operating companies in development of various processes.

Briefs . . . .

Paragraphs on developments of interest and significance within the metalworking industry

Electro-Motive Division of General Motors Corp. concluded an agreement with Nydqvist & Holm Aktiebolag, Trollhattan, Sweden, for manufacture of diesel-electric locomotives. The Swedish firm will market in Scandinavia and overseas territories diesel-electric locomotives embodying GM's 567B locomotive diesel engine and other transmission components. Mechanical and some electrical equipment manufactured by Nydqvist & Holm and other Swedish firms will go into the locomotives.

—o—

Baldwin Locomotive Works, Philadelphia, will build three 88,000-hp hydraulic turbines for the Garrison Dam on the Missouri river, 75 miles north of Bismarck, N. D. Order was received from the Corps of Engineers at Bismarck. Price, including spare parts, is $2,640,000.

—o—

Vacu-Blast Co. Inc., San Mateo, Calif., has established three regional offices: Mr. David G. Shipley is manager of one in South Gate, Calif.; Bert B. Jarl is in charge of one in New York; and James H. Turnbull is regional manager in Baltimore.

—o—

Sminkey & Haas, a company which handles abrasives, cutting tools and industrial diamonds, has been formed in Chicago.

—o—

Allis-Chalmers Mfg. Co. marked the 50th anniversary of the firm's Boston Works with a three-day program. Officers and directors toured the plant. An open house for plant employees and their families also was held.

—o—

Burndy Engineering Co. Inc., New York, signaled its entrance into the automotive industry by introduction of a line of packaged electrical connectors. Company offers its Hydent indent-type connectors for automotive electrical systems.

—o—

Milwaukee Power Equipment Co. was purchased by A. J. Kempfert from John V. Coughlin. Firm rents heavy equipment on a day-to-day basis and distributes industrial and construction equipment and tools.

—o—

Steel or Bronze Piston Ring Co., Indianapolis, announces a new series of "Non-Breakable" piston rings made of stainless steel which maintains tension under excessive temperatures and is corrosion resistant. Besides being free from distortion, the rings are said to reduce friction and wear by providing a "dissimilar" metal for the rubbing surfaces and to increase compression efficiency by a near-constant expansion factor that permits closer tolerances between ring and cylinder wall.

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Tin Research Institute Inc. has been organized to provide free technical service to users of tin in the U. S. Technical experts are available for consultation and practical assistance either at the institute or at consumer's plants. Office is in Columbus, O.

—o—

Interstate Commerce Commission authorized a merger of three short-line railroads controlled by U. S. Steel Corp.: Pittsburgh, Bessemer & Lake Erie; Meadville, Conneaut Lake & Linesville; and Bessemer & Lake Erie. These roads, with 192 miles of track in Pennsylvania and Ohio, will consolidate under the name, Bessemer & Lake Erie Railroad.

—o—

Welded Construction Engineering Co. and **Cleveland Steel Barrel Co.,** both of Cleveland, received more than $1 million worth of government orders. Welded Construction will make $400,500 worth of dollies to be used in maintenance of B-36 and B-29 bombers; Cleveland Steel Barrel has a $600,000 order for steel drums for the Army.

—o—

John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire products, opened a new office and warehouse in Cincinnati. W. K. Hanna is manager.

—o—

Aluminum Ladder Co., Worthington, Pa., will sell its aluminum straight, step, extension and fire ladders under the tradename "Alco-Lite." Company also manufactures aluminum gangways.

—o—

Berger Mfg. Division of Republic Steel Corp. opened its Indianapolis warehouse to serve jobbers of sheet metal, building products and equipment products like shelving, kitchen cabinets, office equipment and tool room equipment.

—o—

Weatherhead Co. will build a $65,000 addition to its St. Thomas, Ont., plant. Company manufactures parts for automobiles, refrigerators and oil burners.

PRODUCT DISPLAY: To increase employee understanding and appreciation of important roles throughout the industry of the things they make, SKF Industries Inc. started a series of customer product displays. Two workers in the firm's Philadelphia cafeteria pause to look at a cutaway model of a Curtiss-Wright Cyclone engine equipped with bearings they helped to make

—o—

Iron Lung Ventilator Co. is the new name for Powermatic Ventilator Co., Cleveland, makers of Iron Lung roof ventilators, intake units and related items.

—o—

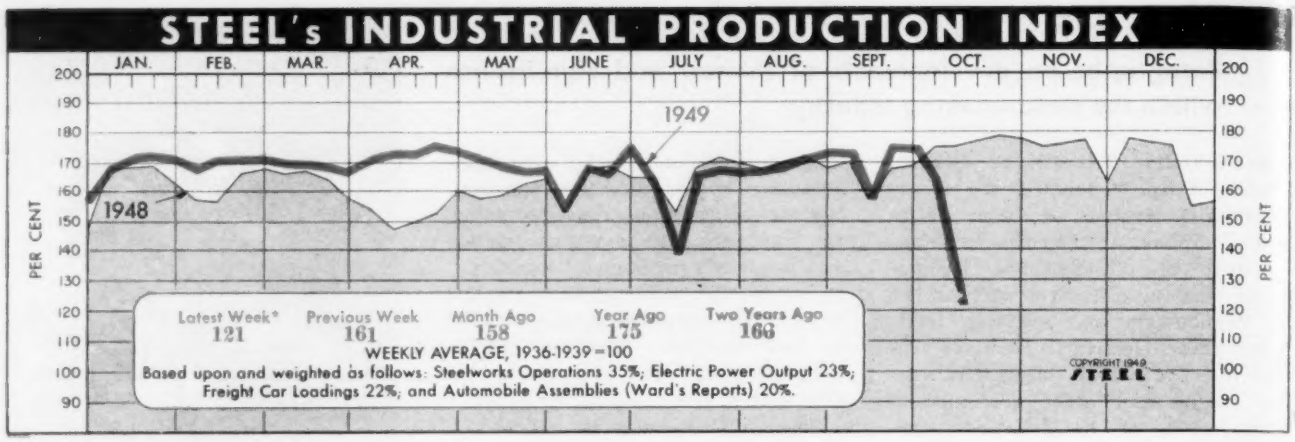
Washington Aluminum Co., Washington, manufacturers of aluminum marine equipment in Baltimore, appointed M. J. Gigy & Associates, San Francisco, as Pacific Coast agent.

—o—

Hoffman Bros. Inc. is a newly incorporated general contracting firm in Milwaukee. Office is in the firm's Tenth street warehouse. Officers are Joseph Hoffman, president; Hugo Hoffman, vice president; and Roland N. Hippert, secretary-treasurer.

—o—

Hunter Spring Co., Lansdale, Pa., is running its third season of technical courses offered to engineers, inspectors, purchasing agents and designers on the subjects: Quality Control by Statistical Methods and Modern Spring Design. For details, write to Ralph P. Coleman Jr., Hunter Spring Co., 1 Spring Ave., Lansdale, Pa.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1948
1949
Latest Week* 121
Previous Week 161
Month Ago 158
Year Ago 175
Two Years Ago 166
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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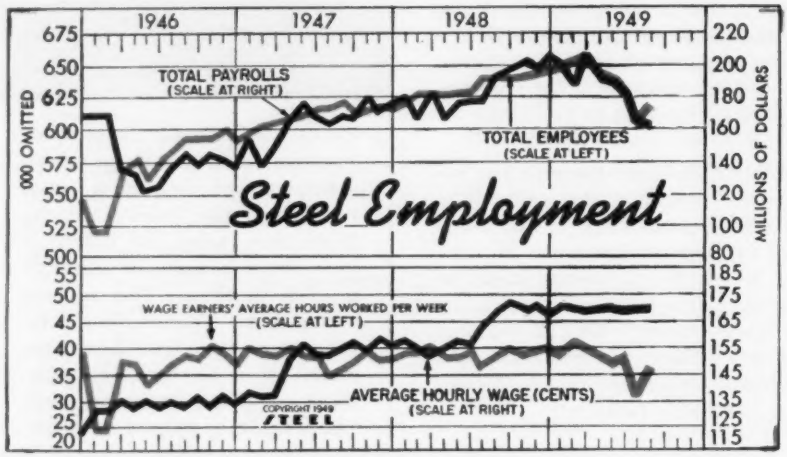
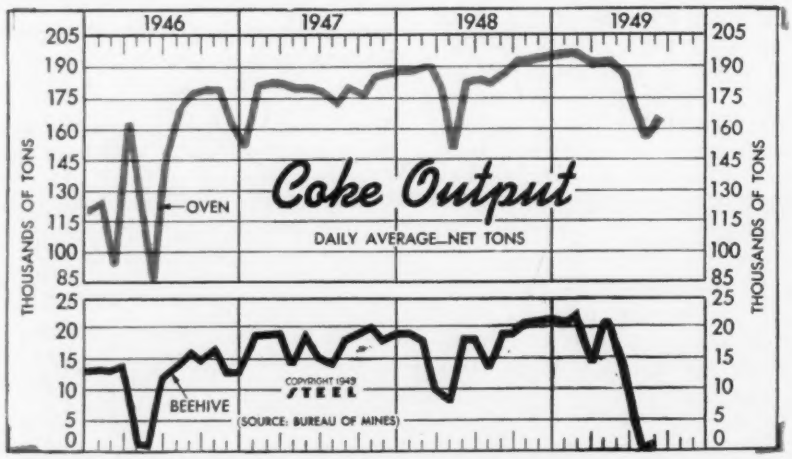
* Week ended Oct. 8 (preliminary).


1946 1947 1948 1949
000 OMITTED
MILLIONS OF DOLLARS
TOTAL PAYROLLS (SCALE AT RIGHT)
TOTAL EMPLOYEES (SCALE AT LEFT)
Steel Employment
WAGE EARNERS' AVERAGE HOURS WORKED PER WEEK (SCALE AT LEFT)
AVERAGE HOURLY WAGE (CENTS) (SCALE AT RIGHT)
COPYRIGHT 1949 STEEL

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1949	1948	1949	1948	1949	1948
Jan.	650	622	$202.1	$180.2	171.3	157.3
Feb.	653	626	189.8	167.6	169.6	155.1
Mar.	652	629	207.2	183.0	168.5	154.8
Apr.	647	626	191.9	168.5	168.8	155.1
May	637	628	188.4	175.3	169.7	157.7
June	625	634	181.8	179.5	168.4	156.9
July	610	641	160.3	179.8	169.9	164.5
Aug.	603	645	175.6	193.8	168.2	168.9
Sept.	...	...	641	....	199.4	.... 171.8
Oct.	...	...	644	....	201.7	.... 169.9
Nov.	...	...	646	....	199.8	.... 172.1
Dec.	...	...	648	....	205.8	.... 169.4

† Monthly average.

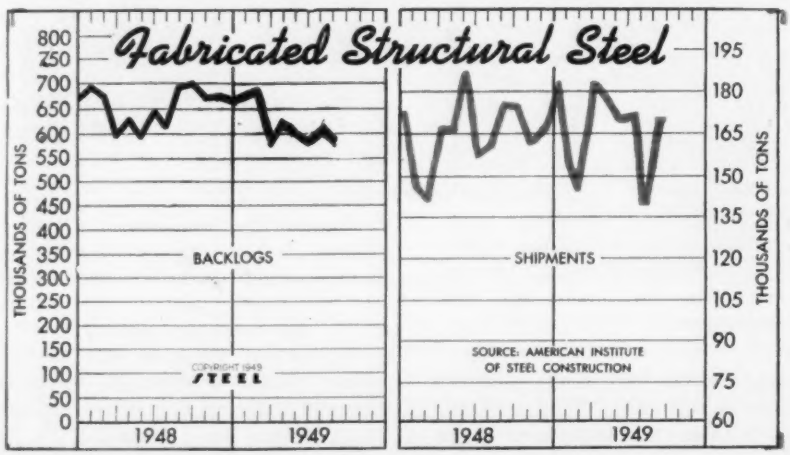


Coke Output

Bureau of Mines

(Daily Average Net Tons)

	Oven		Beehive	
	1949	1948	1949	1948
Jan.	196,000	189,191	20,121	19,588
Feb.	195,551	190,098	22,261	18,625
Mar.	192,183	182,340	14,030	10,485
Apr.	192,019	149,692	21,098	8,235
May	187,040	184,568	17,017	18,651
June	174,748	187,200	8,931	18,700
July	158,407	184,286	776	14,032
Aug.	165,884	188,468	1,460	19,751
Sept.	...	.....	192,090	 19,616
Oct.	....	.....	192,440	 20,083
Nov.	...	.....	193,565	 20,341
Dec.	...	.....	195,670	 20,588
Ave.	...	.....	185,634	 17,391



Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1949	1948	1947	1949	1948	1947
Jan.	152.7	146.4	140.6	675	692	661
Feb.	145.9	141.6	136.1	683	673	656
Mar.	185.9	167.0	137.8	582	597	614
Apr.	179.2	166.7	157.4	628	630	632
May	171.1	186.9	155.0	599	593	628
June	172.3	157.1	151.9	583	647	634
July	143.6*	160.8	169.9	605	613	661
Aug.	172.2	176.3	158.0	583	691	639
Sept.	....	175.0	164.3	...	698	648
Oct.	....	164.0	196.1	...	669	649
Nov.	....	169.8	175.0	...	673	645
Dec.	....	182.4	173.0	...	670	671
Total	....	1,993.9	1,915.1			

* Revised.

The Business Trend

IMPORTANCE of the steel industry in the nation's economy is shown graphically in the chart atop the facing page. The first full week's loss of steel production as result of the steelworkers' strike cut STEEL's industrial production index from 161 per cent of the 1936-1939 average to 121 per cent in the week ended Oct. 8. The drop is even more severe than the 40 points indicate, for before the plunge the index already was below normal.

STEEL—In the first full week of the latest steel strike the nation's ingot rate fell to 7.5 per cent of capacity, lowest point since the strike period in February, 1946. Not all of the steel mills are strikebound (see STEEL, Oct. 10 issue p. 88) but all of the largest producers have been idled by the walkout.

AUTOMOBILES—Only one automobile builder has found it necessary to cut its assembly rate thus far. In the week ended Oct. 8 the industry's outturn was 148,072 passenger cars and trucks, about 3500 units below the preceding week. Truck assemblies, particularly in the heavier models, may be affected by walkouts in plants of components suppliers who have contracts with United Steelworkers of America. Assembly schedules are being eased by most automobile builders by eliminating overtime. Result: Average daily assembly rate in U. S. plants dropped to 28,130 units in the first October week compared with the industry's alltime peak of 29,460 reached in September.

POWER—Electric energy sales to ultimate customers totaled almost 20 billion kwhr in July, 3.1 per cent more than in the same month last year. Edison Electric Institute totals show that revenue from these sales was $375.4 million, an increase of 7.8 per cent over July, 1948.

RAILROADS—American Railway Car Institute says that domestic freight car deliveries totaled 6141 in September. August production was 7178 cars. Car builders completed 3936 cars in September and 2205 were built in railroad shops. Production of the leading types was: Box, 1362; hopper, 2121; gondola, 1684; refrigerator, 351; tank, 368.

COAL—Bituminous coal output was about 1.8 million net tons in the week ended Oct. 1. This coal came from non-union mines and those operated by the Progressive Miners union. Mines employing UMW miners were strikebound. In the corresponding week last year production was about 12 million tons.

CONSTRUCTION—New construction put in place in September was valued at $1.9 billion, reaching a seasonal peak at about the same level as last year. For the first nine months of 1949, value of new construction amounted to $14 billion, 1 per cent more than the total for the same period last year, says the Commerce Department's Construction Division. Many types of private construction have dropped below the levels of a year ago but public construction has more than made up the difference.

PRICES—Bureau of Labor Statistics wholesale price index rose 0.1 per cent in the week ended Oct. 4 to 152.5 per cent of the 1926 average.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	7.5	70.0	85.0	97.0
	Electric Power Distributed (million kilowatt hours)	5,350‡	5,521	5,258	5,842
	Bituminous Coal Production (daily av.—1000 tons)	304	337	1,342	2,009
	Petroleum Production (daily av.—1000 bbl)	4,800‡	4,891	4,851	5,535
	Construction Volume (ENR—Unit $1,000,000)	$152.4	$163.9	$146.5	$170.2
	Automobile and Truck Output (Ward's—number units)	148,072	151,593	123,806	119,938
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons. ‡Preliminary.				
TRADE	Freight Carloadings (unit—1000 cars)	608†	658	624	892
	Business Failures (Dun & Bradstreet, number)	182	181	148	107
	Money in Circulation (in millions of dollars)‡	$27,476	$27,348	$27,589	$28,802
	Department Store Sales (changes from like wk. a yr. ago)‡	−8%	−8%	−5%	none
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$13,589	$13,071	$12,640	$14,150
	Federal Gross Debt (billions)	$256.6	$256.6	$256.4	$252.3
	Bond Volume, NYSE (millions)	$13.4	$13.6	$9.7	$15.2
	Stocks Sales, NYSE (thousands of shares)	6,883	6,179	3,201	3,484
	Loans and Investments (billions)†	$66.1	$66.5	$65.8	$61.9
	United States Gov't. Obligations Held (millions)†	$37,004	$37,874	$37,307	$32,559
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	172.2	175.9	180.3	220.7
	All Commodities†	152.5	152.4	153.0	166.1
	Metals and Metal Products†	170.1	170.3	169.2	172.3
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry

CHARLES E. WALKER JR.

E. W. ALLISON

ARTHUR C. KREUTZER

Charles E. Walker Jr. has been elected vice president, **Dravo Corp.,** Pittsburgh. He will continue as secretary and director of industrial relations of the corporation, which positions he has held since 1944. He joined Dravo in 1933 as a member of the accounting department.

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Verne E. Cornell, general manager of the Ackermann plant, **Wheeling Steel Corp.,** Wheeling, W. Va., has been appointed chief engineer of the corporation. **James F. Baxa,** assistant general manager, Ackermann plant, has been appointed general manager of that plant. **M. E. Marsh,** general manager of the Wheeling factory, has been appointed assistant general manager of all the company's factories, and is succeeded by **R. L. Jolly,** formerly assistant general manager, Wheeling factory. Mr. Jolly is succeeded by **H. V. Corcoran. S. C. Wood** and **K. P. House** have been appointed assistant managers of the Tubular Sales Division.

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Appointment of **J. R. Connell** as assistant purchasing agent is announced by **Babcock & Wilcox Tube Co.,** Beaver Falls, Pa. Mr. Connell has been in charge of the purchasing department of the company's Welded Tube Division. Prior to association with B & W he was with the sales and metallurgical divisions of Carnegie-Illinois Steel Corp.

—o—

T. H. Cable has been appointed to the sales department, central staff, of **Koppers Co. Inc.,** Pittsburgh. He has been eastern advertising manager for Westinghouse Electric Corp. for the last three years with headquarters in New York.

E. W. Allison has been elected secretary-treasurer of **Detrex Corp.,** Detroit. Associated with the company since 1941, he has progressed through the legal department and the positions of assistant secretary and secretary. He retains his duties as secretary with supervision over the legal and personnel departments. Mr. Allison, prior to joining Detrex, spent six years with a Detroit law firm after graduation from the University of Michigan Law School. **G. E. Powers,** whom Mr. Allison succeeds, has retired after 25 years with the company.

—o—

Harold Von Thaden has been elected corporation vice president, **Hewitt-Robins Inc.,** Buffalo. **Benjamin T. Moffatt** has been elected a director, and **John Hoyt** as assistant to the president. Mr. Van Thaden has been vice president and general manager of the Engineering Division. Mr. Moffatt, a corporation vice president since 1941, has been placed in charge of sales. Mr. Hoyt was with the company's Engineering Division and its Robins conveyors unit for many years.

—o—

Nils Anderson Jr., formerly vice president, Chemical Division, Borden Co., New York, has joined **Debevoise-Anderson Co.,** New York, as vice president. Before the war he was with Bakelite Corp., and later became a director of Debevoise-Anderson, a post he still holds.

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N. J. McCartney, formerly sales manager, **Gould Storage Battery Ltd.,** Kingston, Ont., National Battery Co. subsidiary, has been promoted to vice president in charge of sales in Canada.

Arthur C. Kreutzer has been appointed managing director, **Liquefied Petroleum Gas Association Inc.,** Chicago. He will assume the duties of **Howard D. White,** executive vice president, who resigned effective Oct. 31 to become associated with the newly organized Perlite Development Corp., Albuquerque, N. Mex., as an owner and officer. Mr. Kreutzer has been counsel and secretary of the association since 1946.

—o—

General Refractories Co., Philadelphia, announces the following appointments and transfers of sales personnel; **Roger W. Braden,** formerly manager, Detroit warehouse, has been reassigned as manager, New York warehouse; **DeWitt C. Clement Jr.,** transferred from the estimating department to the New York warehouse as a member of its sales force; **Alan R. Eakins,** transferred from the estimating department to the New York warehouse sales force; and **Richard H. Lightfine,** transferred from the New York warehouse to the New York district sales office.

—o—

W. C. Stolk, recently elected executive vice president, **American Can Co.,** New York, has been made a director to succeed **James B. Taylor,** retired because of ill health. Mr. Taylor was a member of the board for 27 years.

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Alan Ede has been appointed resident salesman for **Kaiser Steel Corp.,** with offices in Stockton, Calif.

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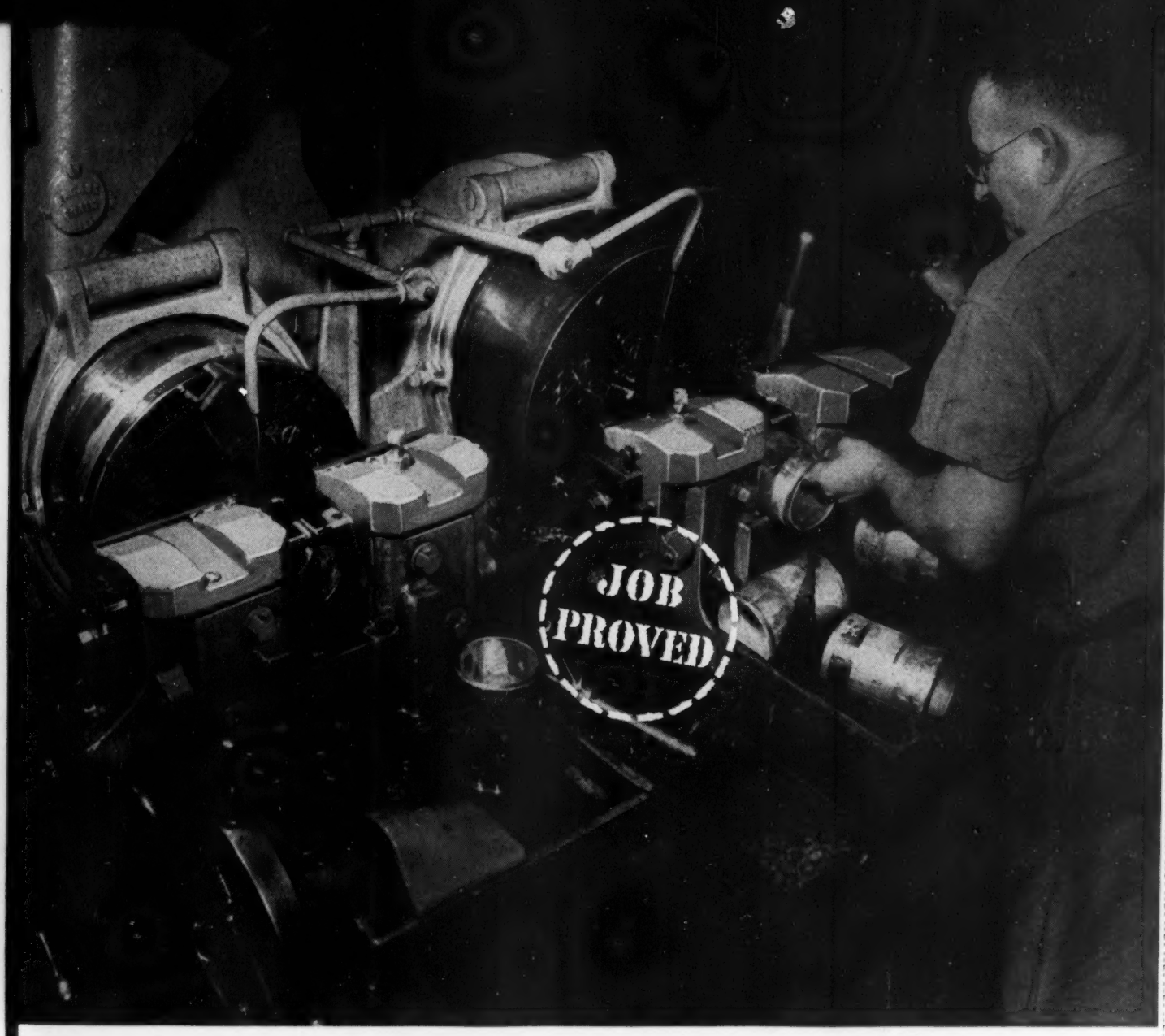
Michael J. Phillips has been appointed general manager of the newly formed Industrial Division, **Greer Hydraulics Inc.,** Brooklyn, N. Y. In his new post Mr. Phillips will supervise pro-



CHASER LIFE INCREASED 50%

Sun Cutting Oil Improves Quality of Threads, Steps-up Pipe Nipple Production

Operation: Threading 4" pipe nipples

Machine: Landis Threading Machine

Material: 4" galvanized welded steel tubing SAE 1025-1040

Speed: Threading 1½" on each end of about 300 pieces per 8-hr. day

Chaser Life: 3 days before resharpening

Cutting Fluid: Sun Cutting Oil 31W

A manufacturer threading pipe nipples was not getting satisfactory finished threads with the cutting fluid in use. Chaser life was abnormally short, resulting in excessive downtime and high percentage of rejects, with consequent loss of production.

Changing to Sun Cutting Oil 31W, this shop increased chaser life 50 percent, and reports that "the threads are the best we ever made." With rejects practically eliminated and downtime for changing chasers reduced to the absolute minimum, production has greatly increased.

Sun Cutting Oil 31W is a dark, free-flowing, sulphurized oil. It is recommended for heavy duty jobs where an emulsified cutting oil is not suitable. For further information about Sun Cutting Oils or other "Job Proved" Products for the metalworking industry, call or write the nearest Sun Office. The services of a Sun Engineer are available without obligation.

SUN OIL COMPANY · *Philadelphia 3, Pa.*

In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

duction and marketing of Greer hydropneumatic accumulators and other hydraulic components for industry.

—o—

Richard H. Bancroft has been ap-

RICHARD H. BANCROFT

pointed executive engineer, **Perfect Circle Corp.,** Hagerstown, Ind., assuming the position left vacant by the retirement of **Macy Teetor. Dan Teetor,** who has been acting head. Engineering Division, since Macy's retirement in September, 1946, continues as vice president and an active member of the executive committee. Mr. Bancroft, associated with Perfect Circle since 1931, has been castings plant manager for the corporation, in which position he was in charge of both the corporation foundry at New Castle, Ind., and the sleeve castings plant at Richmond, Ind. **Dallas F. Lunsford** replaces Mr. Bancroft as head of the foundry, and **Robert C. Myers** was named to succeed as head of the sleeve castings plant.

—o—

William P. Gobeille has been appointed superintendent of the Milwaukee plastics plant of **Nash-Kelvinator Corp.** He joined the corporation last year as assistant manager of the plastics plant, after eight years of experience in the manufacturing field. He served as works manager, Cruver Mfg. Co., and held sales and engineering positions with a Milwaukee metalworking firm and a Chicago manufacturer of industrial sewing machines.

—o—

E. Richard Walter has been appointed mid-western sales representative, Plastic Metals Division, **National Radiator Co.,** Johnstown, Pa. He will have charge of sales of metal powders in Ohio, Michigan, Indiana, Illinois, Missouri, Iowa, Wisconsin and Minnesota, and will have headquarters in Chicago. He goes to Plastic Metals from Powdered Metal Products Corp., Chicago.

—o—

Clarence L. Holmberg, since 1946 manager of the order division of the sales department of **Inland Steel Co.,** Chicago, has been appointed superintendent of business procedures at the company's Indiana Harbor Works, and **Henry N. Schumacher** has been named to succeed Mr. Holmberg. Mr. Holmberg joined Inland in 1927, and Mr. Schumacher in 1934.

—o—

Howard R. Swartz has been appointed general sales manager, **Cleveland Cap Screw Co.,** Cleveland. He has been transferred from Lansing, Mich., where he represented the Cleveland company for a number of years as a member of M. C. Snyder Co., manufacturer's agents.

—o—

Gulf Oil Corp., Pittsburgh, has named

D. P. CLARK

the following men to newly created managerial positions in its reorganized program of domestic sales: **D. P. Clark** has been named general manager, direct marketing, in charge of the primarily direct-to-consumer commercial, contractor, industrial fleet and transportation markets. **W. R. Huber** was appointed general manager, retail marketing; **W. E. Dermody,** advertising manager; **C. E. Skinner,** commercial research manager; and **G. T. Ryan,** operations manager.

—o—

Standard Pressed Steel Co., Jenkintown, Pa., has appointed **George A. Gade** regional sales manager in charge of midwest territories with headquarters in Detroit. **Francis J. Kinsella** succeeds Mr. Gade as district manager of the firm's Detroit office and warehouse. **David J. Hurford,** Cincinnati district manager, has been named special representative for aircraft products on the West Coast. **William C. Harper** has been selected for the Cincinnati post. **A. Clayton Graham** replaces Mr. Harper as sales representative in the New England territory.

—o—

Dr. Joseph A. Orsino, George Vahrenkamp, Dr. Charles H. Moore and **Edwin P. Peterson** have been transferred to the New York office of **National Lead Co.** to act as assistants to **Alex Stewart,** director of research. They will integrate and co-ordinate research and development for all the company's laboratories. Dr. Moore has been a department supervisor, Titanium Division laboratories, Sayreville, N. J.; Dr. Orsino has been in charge of storage battery research at the Brooklyn, N. Y., laboratories; Mr. Peterson has been in charge of paint and pigment research and development, Brooklyn, and Mr. Vahrenkamp has been engaged in metallurgical and smelting research at Brooklyn laboratories.

—o—

Samuel F. Dubs has been appointed chief metallurgist for **Morris P. Kirk & Son Inc.,** subsidiary, National Lead Co., New York. **W. A. Senter** was named acting superintendent of Kirk's Los Angeles plant.

—o—

Charles W. T. Stuart, president, Safety Car Heating & Lighting Co. Inc., New York, has been elected to the board of directors of **American Arch Co. of Delaware** and **American Arch Co. Inc.,** New York.

—o—

Richard H. Diesel has been appointed production manager of the Stamford

RICHARD H. DIESEL

Division, **Yale & Towne Mfg. Co.,** New York. He succeeds **Frank C. Prucha** who will retire in November after 42 years with Yale & Towne. Mr. Diesel has been associated with the company since 1939 and prior to his

No tugging! No warping!
NO WONDER everyone wants this new kind of slats
in venetian blinds! Because ALUMINUM LASTS

As though it weren't enough to give you *lightweight* venetian blinds, clever manufacturers who use Alcoa Aluminum also give you blinds that stay new-looking!

Here's how it happened:

Starting with pure aluminum, we spent years alloying it with small amounts of other metals. Found ways to roll the strong alloy into strips—wafer-thin, feather-light, but strong as steel. Showed manufacturers of venetian blinds how to finish them in natural aluminum or colorful paint.

That kind of development takes time. But it enables us to say "Alcoa Aluminum lasts!" and back it up, in thousands of products that mean better living for you. ALUMINUM COMPANY OF AMERICA, 2115K Gulf Bldg., Pittsburgh 19, Pa. Sales offices in principal cities.

ALCOA

FIRST IN ALUMINUM
THE METAL THAT LASTS

latest appointment was director of systems and procedures. **Frank S. Haniewich** who joined the firm in May of this year as systems engineer after 12 years with Weatherhead Co. has been named assistant production manager.

—o—

John R. Cary has been appointed sales manager, **Browning Crane & Shovel Co.,** Cleveland, succeeding **William H. Waite** who has retired following long service with the company.

—o—

Raymond A. Cole has resigned as vice president, **Pope Machinery Corp.,** Haverhill, Mass.

—o—

F. Donald Hart, executive vice president, Tennessee Enamel Mfg. Co., Nashville, Tenn., has been elected chairman of the marketing committee of the **Gas Appliance Manufacturers Association. D. R. Meckstroth,** associate director of sales research, Servel Inc., Evansville, Ind., has been designated vice chairman.

—o—

Election of officers at **Affiliated Furnace & Engineering Inc.** was erroneously reported in STEEL, Oct. 3 issue, as being at **Chemsteel Construction Co. Inc.,** Pittsburgh. Affiliated Furnace & Engineering is a new associated company created by Chemsteel to specialize in design, construction and maintenance of industrial furnaces. The new company's officers are: **Arthur M. Krieger,** president and general manager; **Clarence B. Avery,** vice president-engineering; **Merrill A. Stewart,** vice president-construction; and **Charles E. Stone,** secretary-treasurer.

—o—

Dr. Martin M. Freundlich has joined **Airborne Instruments Laboratory,** Mineola, N. Y., where he will be in charge of the newly established tube laboratory in the applied physics section directed by **Rodney F. Simons.** Dr. Freundlich has been closely identified with television research at Columbia Broadcasting System.

—o—

P. M. Offill Jr. will represent **George P. Reintjes Co.,** Kansas City, Mo., in the sale of suspended arches and walls in the Pittsburgh area. He formerly represented the company in California.

—o—

Whitney E. McDowell has been appointed to the sales staff of **Barney I. Florey Co.,** Cleveland, representative for Automatic Transportation Co., Chicago. Before joining Florey Mr. McDowell worked for American Steel & Wire Co., and later as a field engineer for Edison Storage Battery Division, Thomas A. Edison Inc., in the Cleveland area.

—o—

W. L. Veit has been appointed specialist on Crescent woodworking machinery to the Power Tool Division, **Rockwell Mfg. Co.,** Milwaukee. Mr. Veit served as sales manager of Crescent Machine Co. and held the post after Crescent became a division of Rockwell. Power Tool Division combines the sales organizations of Delta, Crescent and Red Star Products into a single sales organization.

—o—

M. Adolph Heikkila, until recently with New Jersey Zinc Co., has formed his own public relations consulting service at 35-15 91st St., Jackson Heights, L. I., N. Y.

—o—

Edward W. Bowman has been appointed engineer, Arch & Wall Sales Division, **Laclede-Christy Co.,** St. Louis. He will make his headquarters in Pittsburgh. Mr. Bowman spent a number of years in industrial furnace design and construction.

—o—

Ernest H. Pauli has been appointed an industrial distributor for **Atlas Chain & Mfg. Co.,** to serve northern New Jersey, New York and western Connecticut. Mr. Pauli, who has offices in Manhattan and Newark, has gained experience in the power transmission field through the representation of such products for many years.

—o—

C. K. Banks has been named director of research, **Metal & Thermit Corp.,** New York. He had previously headed the chemotherapy division of Parke, Davis & Co. research laboratories in Detroit. His new headquarters will be the company's Research Laboratory at Woodbridge, N. J.

C. K. BANKS

Carl E. Berndt has been appointed manager of warehouse products for **Timken Roller Bearing Co.,** Canton, O. **Anthony J. Lombardi** has been appointed warehouse supervisor, succeeding Mr. Berndt.

—o—

Charles E. Stevens Jr. has joined **Chicago Railway Equipment Co.,** Chicago, as plant manager. Since 1941 he has been with **Fairchild Engine & Airplane Corp.,** most recently as chief engineer of the **Al-Fin division.** In addition to his other duties, Mr. Stevens will direct the development work on the Al-Fin bimetallic aluminum bonded to iron brake drums, pistons and other bimetallic products for Chicago Railway Equipment Co. and its subsidiaries.

—o—

Robert Trefcer has been appointed western sales manager, **Sargent & Co.,** with office in San Francisco.

—o—

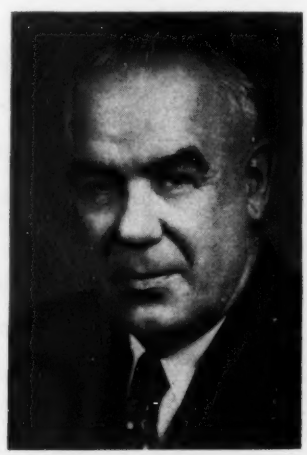
E. Victory Spielberg has been elected president of the newly organized **Steel Improvement Co. Ltd. of Canada.** Other officers are **Louis H. Elsie** and **Bruce H. Mowat,** both of Atlas Engineering & Machine Co. Ltd.

—o—

Russell C. Clark, vice president, Tin Sales Corp., agent for Reconstruction Finance Corp., since formation of the company in 1943, has resigned to join **Nathan Trotter & Co.,** metal merchants of Philadelphia. Mr. Clark will open a New York office at 24 State St. where a brokerage business in metals, particularly pig tin, will be conducted.

—o—

W. J. Scott, manager of manufacturing plants, Chevrolet Motor Division, **General Motors Corp.,** Detroit, has been appointed general manufacturing manager. He has been with Chevrolet for 34 years. In his new position he succeeds **Hugh Dean** who has been appointed GM vice



W. J. SCOTT

president in charge of the manufacturing staff. **E. S. Wellock,** manager of assembly, plants, succeeds Mr. Scott as manager of manufacturing plants. **R. G. Ford,** general purchasing agent for the division, succeeds Mr. Wellock as manager of assembly plants.

—o—

Frederick A. Mattfield has been appointed factory manager of the Elmira, N. Y., plant, Eclipse Machine Division, **Bendix Aviation Corp.** He succeeds **S. B. Kurzina** who has accepted a position with Curtiss-Wright Corp. in Woodridge, N. J. Mr. Mattfield has been with Eclipse since 1941 and prior to his latest appointment served as general superintendent.

—o—

Angus G. Scott, formerly assistant resident representative for **Westinghouse Electric International** Co. at the Westinghouse East Pittsburgh, Pa., works has been named resident representative. He succeeds **Ernest P. Schroeder,** resident representative since 1936, who is retiring. Mr. Scott has been with Westinghouse since 1937 and held a number of sales posts with manufacturing divisions prior to being named assistant resident representative last year.

A. S. GLOSSBRENNER

Assistant vice president of operations, Youngstown Sheet & Tube Co., Youngstown, elected president, Association of Iron & Steel Engineers. Noted in STEEL, Oct. 10 issue, p. 91

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J. N. Jones, formerly electrical service supervisor for **Westinghouse Electric Corp.** in Los Angeles, has been named electrical superintendent of the company's Pacific Coast district. His headquarters will be in San Francisco.

—o—

T. A. White has been named head of the new Pacific Coast sales region created by **Pontiac Motor Division,** General Motors Corp. He will supervise sales in the San Francisco, Portland, Oreg., and Los Angeles zones. **Don R. Stuart** will succeed him as San Francisco zone manager. **A. L. Drury** has been appointed parts sales manager for the division at Pontiac, Mich. He succeeds **L. W. Walker** who has been named sales promotion manager.

OBITUARIES...

Douglas B. Hobbs, 49, in charge of motion pictures, educational and technical information activities, public relations and advertising department, **Aluminum Co. of America,** Pittsburgh, died Oct. 11 in New York of a heart attack. He was attending a convention of the Association of National Advertisers. Mr. Hobbs joined the company in 1923 as a research metallurgist in the Cleveland branch of Aluminum Research Laboratories. He joined the public relations department in Pittsburgh in 1929, and during his 20 years in that department wrote numerous technical and general articles on aluminum for various magazines, and also authored two books.

—o—

Joshua L. Miner, 67, retired vice president of the Lumnite Division, **Universal Atlas Cement Co.,** New York, died Oct. 7 in Plainfield, N. J. He joined the cement company in 1922, and in 1924 became identified with a subsidiary, Atlas Lumnite Cement Co., as manager of sales, production and research. In 1937 he was elected director and vice president of that subsidiary, which became the Lumnite Division of Universal Atlas Cement Co., from which he retired in October, 1947.

—o—

Frank R. Bacon, 77, chairman of the board of **Cutler-Hammer Inc.,** Milwaukee, died Oct. 6. He organized the Cutler-Hammer concern as a Wisconsin corporation, which absorbed both the American Rheostat and Cutler-Hammer Co. of Illinois.

—o—

Noel Urquhart, 42, a staff engineer in the Victor Division, **Radio Corp. of America,** at Camden, N. J., died Oct. 8. Before joining R.C.A. in 1948 he was vice president of the Control Instrument Co., Brooklyn, N. Y., and a technical director of Heyer Industries Inc., Belleville, N. J.

—o—

Frank Schartow, 67, Racine, Wis., industrialist for 40 years, died Oct. 2. He purchased the Barton Co., Racine, in 1911, and changed its name to **Schartow Mfg. Co.** and transferred its operations to South Milwaukee. In 1921 he started **Schartow Iron Products Co.** in Racine. He retired in 1948.

—o—

George D. Keller, 56, president, **Keller Motor Corp.,** Huntsville, Ala., died in New York Oct. 5 while on a business trip. Mr. Keller had been associated with Studebaker Corp. for many years, serving as sales manager before he was elected in 1935 as vice president in charge of sales.

—o—

John D. Halen, 60, president and treasurer, **General Tool & Die Co.,** Cleveland, died Oct. 9 following a heart attack.

—o—

George R. York, 37, of Park Ridge, Ill., salesman for **Bullard Co.,** Bridgeport, Conn., died Sept. 25. He became associated with Bullard in 1937 as a boring mill operator and shortly after was promoted to demonstrator. In 1942 Mr. York was transferred to the Chicago office as sales engineer.

—o—

Edward R. Fitzgerald, 49, assistant engineer of the refrigeration unit, Erie Works, **General Electric Co.,** Erie, Pa., died Oct. 5 after a two-week illness.

—o—

C. Howard Henderson, 53, a former executive of **Curtiss-Wright Corp.** in Buffalo, died Oct. 7 following a heart attack. He was administrative executive in quality control at the aircraft firm in Buffalo for 21 years.

—o—

Walter J. Frost, 83, founder of **Frost Co.,** Kenosha, Wis., in 1902, died Oct. 3. He was president and treasurer of the metal parts firm for 35 years, and chairman of the board of directors when he died.

—o—

Edward W. Londegran, 66, secretary, **Lovell Mfg. Co.,** Erie, Pa., died Oct. 7. He had been associated with the firm for 50 years.

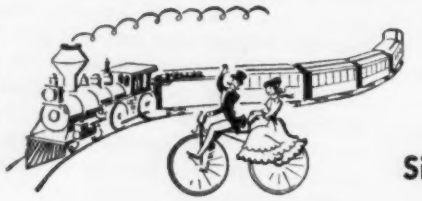
—o—

Harvey M. Smith, 61, president, **Smith-Lee Bottle Cap Co.,** Oneida, N. Y., died Oct. 6. He was a former executive of L. C. Smith & Corona Typewriters Inc., Syracuse, N. Y.

—o—

Lawrence J. Parrish, 56, New York industrialist and former director of industrial relations for **A. O. Smith Corp.,** Milwaukee, died Oct. 2.

80th *Birthday of the oldest name in chain*



Since 1869 . . . Security in every link

IN 1869 the driving of a golden spike united the Union Pacific and Central Pacific Railroads . . . joined our eastern and western coasts.

In the same year Thomas Edison announced the opening of his electrical laboratory. The Indian Wars officially ended. Popular songs were "The Little Brown Jug," "Shoo Fly, Don't Bother Me," and "Up in a Balloon."

And — in 1869 David Round founded the chain-making organization which today operates factories in six U. S. cities . . . whose products are used in homes and industry throughout the world.

David Round learned his trade as an apprentice in his father's hand forged chain plant in Staffordshire, England. A master chain craftsman, he demanded the utmost in fine workmanship . . . refused to compromise with quality.

This insistence upon perfection continues today.

It is the guiding spirit of the organization which is now headed by Raymond L. Round (chairman of the board and president), a grandson of the founder.

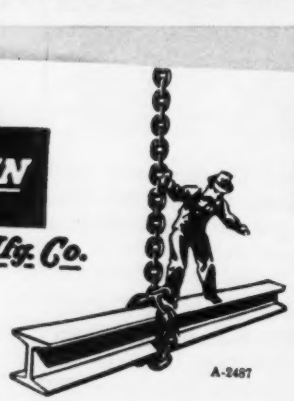
Members of the supervisory group in the Cleveland factory (foremen and superintendents) average 26 years of service. Six have exceeded 40 years. Many families claim three generations in Round plants.

And, working side by side with veteran craftsmen, are large groups of carefully selected younger men. They are being trained to maintain the Round standards of quality...will provide business leadership in years to come.

To the Round organization, the production of fine chain is more than a business. It is a tradition to be upheld . . . a reputation to be carefully guarded. And, above all, it is a clearly recognized responsibility which guarantees that every Round Chain product will be unsurpassed in quality.

CLEVELAND CHAIN

The Cleveland Chain & Mfg. Co.
Cleveland 5, Ohio



Industrial Sling Chains • Farm Chains • Marine Chains • Tire Chains • Log Chains • Building Chains • Railroad Chains • Crane and Dredge Chains • Sugar Cane Sling Chains (with Grip Trip)

Round Associate Chain Companies: **The Bridgeport Chain & Mfg. Co.**, Bridgeport, Conn. • **David Round & Son**, Cleveland, Ohio • **Round California Chain Co.**, So. San Francisco and Los Angeles, Cal. • **Seattle Chain & Mfg. Co.**, Seattle, Wash. • **Woodhouse Chain Works**, Trenton, N. J.

Engineering News . . . AT A GLANCE

PRACTICAL WRINKLE—In sharpening face milling cutters, the operator must hold the cutter against the tooth rest finger of the cutter grinder with his hand while traversing the grinding wheel across the cutter blade. A tool grinding foreman at one plant, Norton Co., Worcester, Mass., reports, found it difficult to hold very small cutters with his hand. With a little experimenting, he discovered that by simply attaching a disk or solid handwheel to the same spindle on which the cutter is mounted, he could manipulate the cutter with same or even greater facility—without slightest discomfort or danger to his hand.

BETTER ARC RESISTANCE—Arrow-Hart & Hegeman Electric Co., Hartford, Conn., currently is employing a new type resin compound in molding bases and protective hoods for its latest line of magnetic starters. Besides exceeding arc resistance of the next best material by 50 to 60 per cent, the compound does not support combustion, resists abrasion and provides superior dimensional stability. Company engineers believe the Libbey-Owens-Ford Glass Co. - developed product will enable the equipment to be used in many locations formerly considered detrimental to the operation of normally-protected devices.

HUGE MAGNETIC PULLEY—Large magnetic pulley shipped to Pennsylvania Glass Sand Corp., Hancock, W. Va., from Milwaukee by Dings Magnetic Separator Co., includes 1500 pounds of Alnico—largest amount of the alloy ever used by the company in a single piece of equipment. To be employed in removing iron impurities from sand used to make glass, the 2200-pound pulley is 24 inches in diameter, 60 inches wide. The aluminum-nickel-cobalt iron alloy casting is magnetized by heavy currents of short durations reaching peaks in the vicinity of 100,000 amperes.

FAST REPLACEMENT— Replacement method worked out by Texas Engineering & Mfg. Co. Inc., Dallas, in supplying new parts for damaged aircraft eliminates necessity of stocking hundreds of expensive parts. Typical of how the tooling department of the company functions in making replacements is the case of an airplane which arrived with a cracked and corroded stabilizer rib. The old rib was sent to tooling where it was used as a mock-up from which a plaster pattern was made. Latter then was sent to the foundry for the necessary work required to make a die which was then routed to the hydro-press section where an identical part was formed. Total time for the process was less than 2 days.

BROADENS COATING APPLICATION— Successful method of flame-spraying polythene on metal surfaces, developed by the Engineering Research lab of E. I. Du Pont de Nemours & Co., Wilmington, Del., is accomplished by a spray gun in which the flame is obtained by mixing fuel gas and air beyond the torch nozzle, rather than by premixing them. Flames 8 to 12 inches long are used and gun is held so surface being covered is about 2 inches from the flame tip. The method enables about 16 square feet of surface to be covered in 1 hour. Tests indicate adhesion of the corrosion resistant material is good, and that temperatures used do not degrade the polythene.

COMPLICATING FACTOR — When determining size of slitter units most suitable for a given plant, it is important to take into account the relation between actual tonnage requirements of the setup, potential slitter production as well as size and weight of coils, thickness of stock and number of cuts to be made to the width. In other words, it is necessary to distinguish between slitter capacity in terms of tonnage it will slit per hour, its capacity in terms of coil weights and stock dimensions that it will handle. The former, it is pointed out, is generally referred to as potential output or production and the latter generally as capacity. Choice is complicated by the fact potential output from any given size of slitter unfortunately is not a fixed quantity. (p. 77)

FINISHING TECHNIQUE DIFFERS—Processing stainless steel into consumer products presents varied finishing problems in which coated abrasives play an important part. Difficulties center principally around need for employing mechanical means for blending-in satin finish on surface areas, marred by spot welding, machining, forming and handling. Methods employed to achieve uniform satiny luster differ from those for most other ferrous and nonferrous alloys—no need for plating or painting. However, they do involve the use of abrasive belts coated with the proper grit and lubricant. (p. 81)

BILLET HEATING — Heating of rounds prior to piercing operations in the manufacture of seamless tubes is one of the most important steps in the procedure. Heating mediums tried to provide the billet with a uniform temperature across its cross section posed problems which finally were overcome only in recent years. The rotary hearth type furnace, which allows radiant exposure of each billet either directly or by reflection from the hearth, was a great step forward. The latest medium to be developed consists of a straight-line series of barrels equipped with radiant burners. Materials in this tunnel-like structure are carried on rolls which are slightly skewed to cause the billets to turn slowly as they proceed in "soaking up" the heat. Radiant heat input is extremely high, shortening time of exposure and minimizing scale loss. (p. 86)

IMPROVED RF INDUCTION HEATING

Cuts Processing Costs

As a result of significant advancements in equipment design, more effective use of high frequency induction heating methods is being made on such jobs as through heating for forging, annealing for forming and drawing operations, selective hardening

By HERMAN C. DUSTMAN
Chief Engineer
High Frequency Division
Lindberg Engineering Co.
Chicago

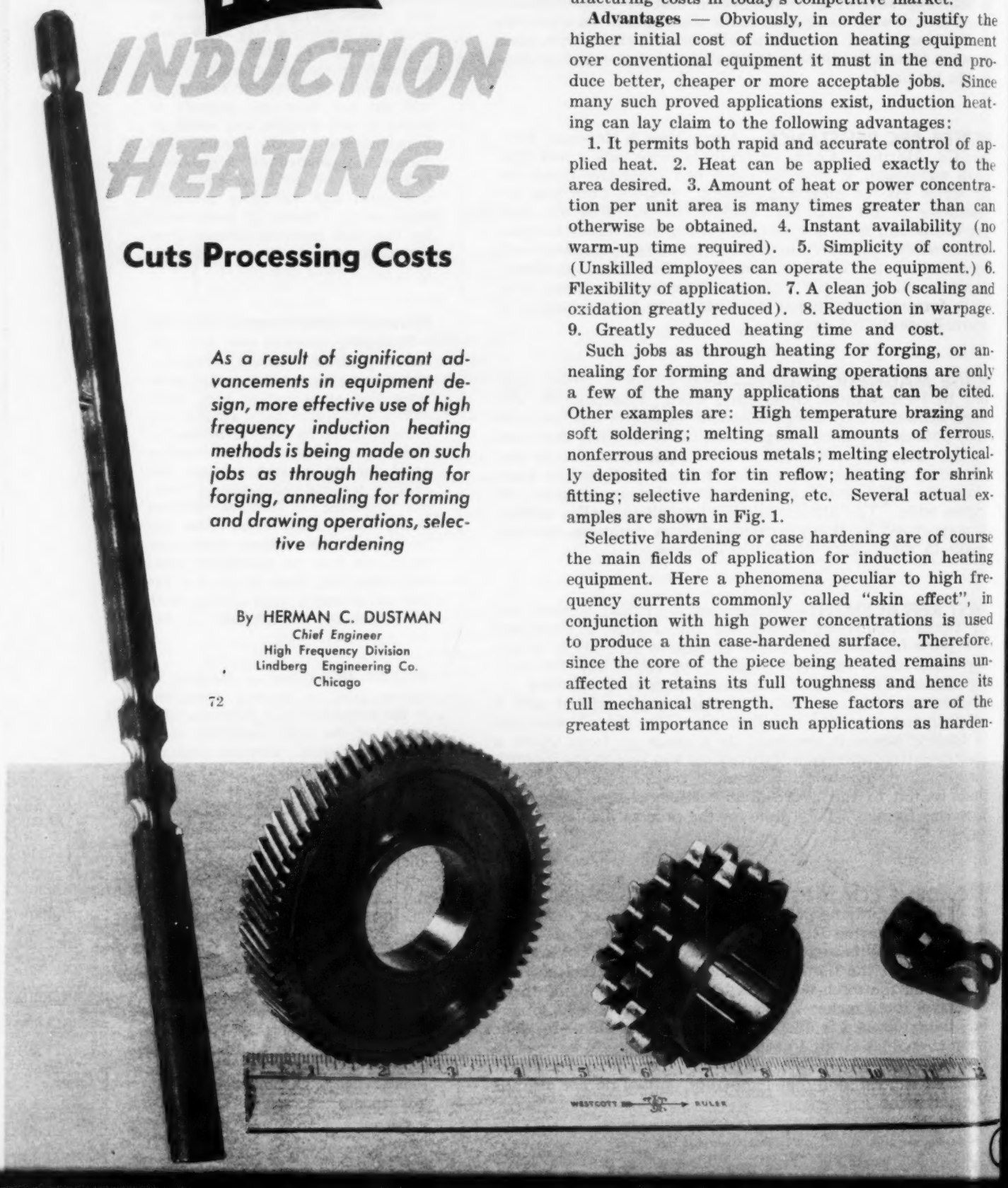
POSTWAR industry is showing continued and increasing acceptance of induction heating equipment even to the point where it is supplementing conventional furnace equipment and replacing other methods of applying heat to various manufacturing operations. While the process has its limitations, nevertheless the savings and economy of this method were proved many times over during the last war where its use solved many a production bottleneck. Hence, it is only natural that high frequency induction heating should become a significant means for reducing manufacturing costs in today's competitive market.

Advantages — Obviously, in order to justify the higher initial cost of induction heating equipment over conventional equipment it must in the end produce better, cheaper or more acceptable jobs. Since many such proved applications exist, induction heating can lay claim to the following advantages:

1. It permits both rapid and accurate control of applied heat. 2. Heat can be applied exactly to the area desired. 3. Amount of heat or power concentration per unit area is many times greater than can otherwise be obtained. 4. Instant availability (no warm-up time required). 5. Simplicity of control. (Unskilled employees can operate the equipment.) 6. Flexibility of application. 7. A clean job (scaling and oxidation greatly reduced). 8. Reduction in warpage. 9. Greatly reduced heating time and cost.

Such jobs as through heating for forging, or annealing for forming and drawing operations are only a few of the many applications that can be cited. Other examples are: High temperature brazing and soft soldering; melting small amounts of ferrous, nonferrous and precious metals; melting electrolytically deposited tin for tin reflow; heating for shrink fitting; selective hardening, etc. Several actual examples are shown in Fig. 1.

Selective hardening or case hardening are of course the main fields of application for induction heating equipment. Here a phenomena peculiar to high frequency currents commonly called "skin effect", in conjunction with high power concentrations is used to produce a thin case-hardened surface. Therefore, since the core of the piece being heated remains unaffected it retains its full toughness and hence its full mechanical strength. These factors are of the greatest importance in such applications as harden-



ing of crankshafts, camshafts, wrist-pins, etc., where both wearability and strength are desired.

Basic Theory—The phenomena of heating both ferrous and nonferrous metals by placing them in an alternating magnetic field have been understood for a long time. In fact, the basic laws and formulas were expounded by Steinmetz, Thompson and others in the early days of electricity. To them, the heat produced as for example, in a transformer core, represented a loss or power waste. However, in induction heating as used today, the object is to produce heat in the work piece which is actually the core of a transformer, the windings being the work coil or inductor. The heat is then produced by the eddy currents induced in the work according to the basic laws of electromagnetic induction.

At the higher frequencies the phenomenon of skin effect adds further to the heating by virtue of the fact that the induced currents flow only through a thin surface layer or "skin" of the conductor. It can be shown that the induced current and hence the depth of instantaneous heat penetration can be expressed as:

$$D = \frac{3550}{2.54}\sqrt{\frac{\rho}{\mu f}} \quad \text{inches.}$$

ρ = resistivity ohms per cm. cube
μ = magnetic permeability
f = frequency in cycles

In Fig. 2 this formula is plotted for various metals and over a wide frequency range.

Basic Types—Three basic types of high frequency induction heating equipment are on the market today. These are:

1. Motor generator sets operating up to 9600 cycles per second.
2. Spark gap sets operating from 200,000 to 400,000 cycles per second.
3. Vacuum tube oscillator generating a frequency of 450,000 cycles per second.

All are capable of performing the various heat treating jobs previously outlined. There is no definite demarcation line in their usefulness. However, in general, due to the deeper penetration of the low frequency currents, motor generator sets find their greatest application where deep-heating or through-heating is permissible. Spark gap equipment and vacuum tube type generators on the other hand both produce higher frequency currents and hence are used where thinner case depths are desirable.

Historically, all three types of equipment had their commercial inception in the early 1920's when the spark gap was the generally accepted means of producing high frequency energy for radio communications. Large water or air-cooled power tubes such as are used in present day induction heating equipment were at an early stage of development and extremely costly. It was not until about 10 years ago that the handicaps of high tube cost and component cost were reduced sufficiently to make the vacuum tube generator commercially practical.

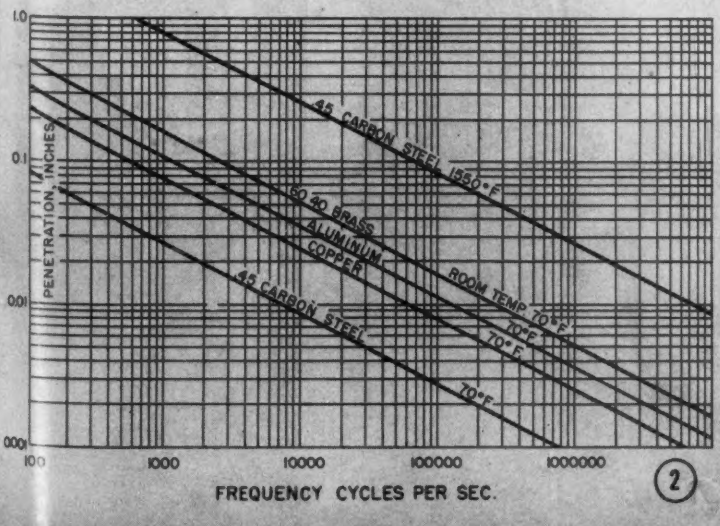
Vacuum Tube Improvements—Since that time the vacuum tube type machine has won increasing acceptance over its older competitor, primarily because the spark gap machine is limited in its power output capabilities and requires a great amount of maintenance. Through the intervening years many improvements have been incorporated in vacuum tube induction heating equipment. Since basically an induction heating unit is a radio transmitter, the design of early equipment was dictated by radio and communications practice. It was soon learned by experience that equipment designed for industrial use required an entirely different perspective.

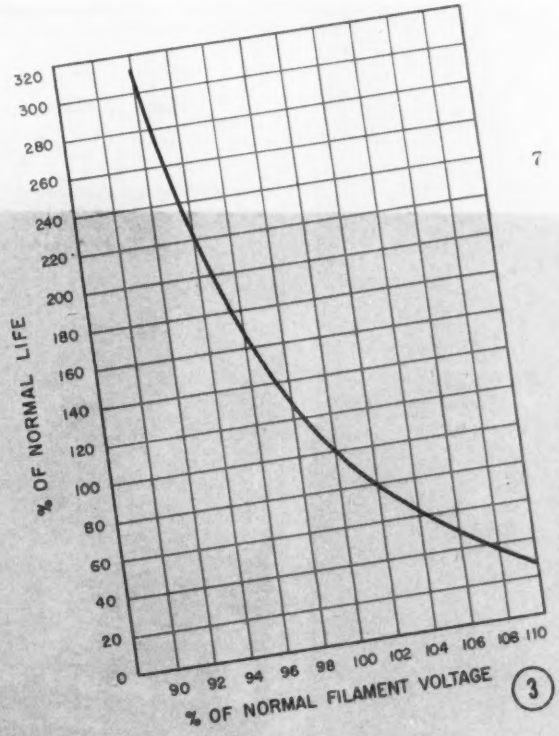
Equipment instead of being carefully adjusted and under constant surveillance by a trained technician or engineer was more apt to be misadjusted and subjected to abuse from untrained and unskilled personnel. Furthermore, simplicity of operation and reliability with a minimum of maintenance, while never ignored in radio transmitter design became an absolute "must"

Fig. 1—Typical work heat treated on a 25 kw induction unit

Fig. 2—Depth of penetration vs. frequency

Fig. 3—Curve showing relation between filament life and applied voltage





in induction heating equipment. The induction heating equipment designer has taken these and other factors into account to produce equipment that is reliable, trouble free and as rugged as any machine tool found in industry today.

New Design Features — A few electrical and mechanical features of a new design, the simplified schematic diagram of which is shown in Fig. 6, are discussed here. In general, the circuit is quite conventional and consists of the familiar three-phase full-wave high-voltage rectifier for converting line voltage to direct current, a vacuum tube oscillator connected as a tuned-plate circuit, and various control and protective relays.

Water or air-cooled transmitting tube producing the high frequency energy is the heart of any induction heating unit, and in this design a thorough comparison was made of the advantages and disadvantages of various types. Until recently the equipment designer had little choice in the selection of available tubes and as a result was forced to use existing types employed in radio communications work. However, several progressive tube manufacturers became interested in the problem and have designed specific types to withstand the rigors of industrial use.

Such tubes feature the strengthening of the internal tube structure, the use of Kovar seals instead of the commonly employed feather-edge seals, a heavy-walled anode structure and other improvements tending to produce longer tube life. Fig. 7 shows such a tube and its radio counterpart.

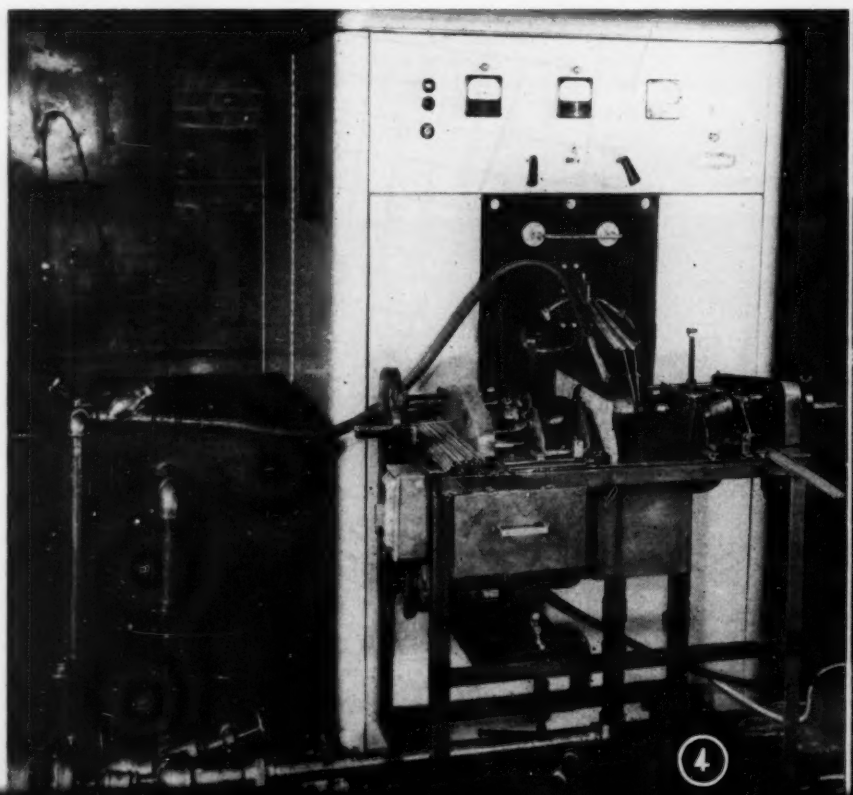
Constant Voltage Filament Supply—In order to protect the oscillator tube adequately and to insure maximum useful life, the associated equipment was carefully selected. Two conditions that can induce early tube failure and which are directly dependent upon auxiliary equipment are: 1. Improper filament voltage. 2. Inadequate cooling.

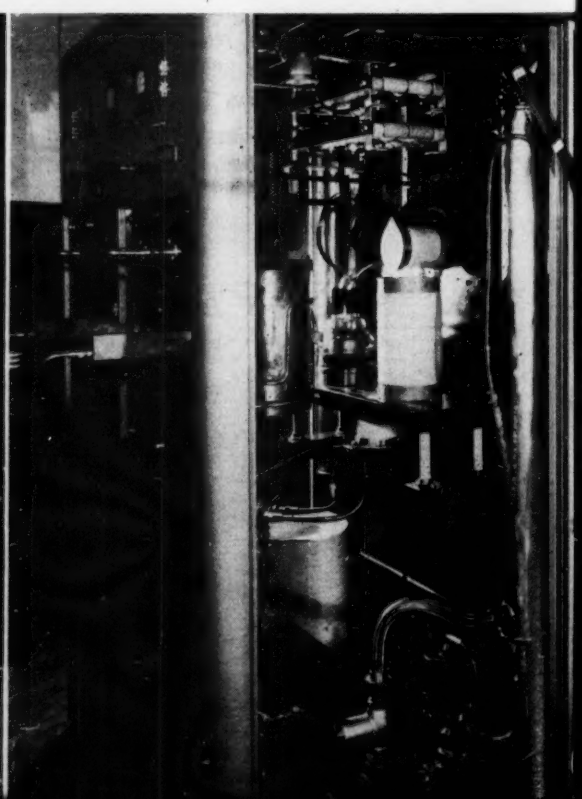
It is common knowledge that overvoltage on a lamp bulb as well as a transmitting tube will result in a shortened life. It can be seen from the curve, Fig. 3, that an overvoltage of 10 per cent results in a life expectancy of 25 per cent of normal. Experience has shown that many commercial power lines often have a fluctuation equal to or greater than this, hence, a constant-voltage source for filament supply was incorporated in the early planning of the design.

Closed Water System—Both air and water have been successfully employed in the past as a cooling means in induction heating units. In general, water cooling is preferable for the larger units, since for any particular tube type the plate dissipation rating, (which means the ability to withstand heavy overloads) is twice that of its air-cooled counterpart. Also, since the units are usually installed in locations where the air is contaminated, the high volume of clean filtered air required by the larger units represents quite a maintenance cost.

However, the use of water cooling in itself is not the simple answer to this problem, since it also has its drawbacks and limitations, as follows: 1. Hard water containing iron and other minerals cannot be used because of the formation of calcium on the anode which prevents proper cooling. 2. Hard water or water of low resistivity aggravates electrolysis and erosion of pipe fittings, water jackets, etc., results. 3. In localities where water costs are high, water consumption of from 6 to 15 gallons per minute can represent quite an operating expense. 4. Water pressure and volume at the site of installation are often inadequate or vary between wide limits.

These disadvantages would seem to present a formidable argument against the use of water cooling. Previously these difficulties were overcome by the addition of an external closed water or recirculating system, entailing additional expense, and requiring external piping and electrical connections. How-





ever, in the unit described, these problems were eliminated by the use of an integral closed water system, carefully engineered to obtain the following results: 1. Permit the use of distilled or rain water in hard water localities, thereby eliminating calcium deposit and electrolysis. 2. Eliminate "sweating" or condensation in humid locations. 3. Reduce raw water consumption and hence operating cost. 4. Eliminate the effect of raw water pressure and volume variations by use of a temperature-controlled valve to average out the fluctuations.

Two-Position Machine—The prospective purchaser of any induction heating equipment is primarily interested in obtaining a unit that will do the job on hand. Frequently following the original installation and set up, the unit is used for other jobs, and in doing them successfully is soon loaded beyond its capacity with various and sundry work. The question then is, how to get a greater quantity of work through the machine in a given time.

Invariably, considerable time is lost in loading and unloading or in preparation of the work prior to heating. Such handling operations can occur simultaneously with heating in a two-position machine, thereby greatly increasing the output capacity. This thought was kept in mind in the design of the present unit. Fig. 5 shows the appearance of such a dual position machine.

It is of interest to note that the changeover from a single to a two-position machine can be made in the field without undue complications. Therefore, increased capacity is readily obtainable at any time it is desired. The upper busses accommodate multi-turn work coils, and the lower, heavy single-turn bus-type coils. Absence of unsightly hose lines, conductors, etc., is another feature.

Theoretically, there is a "best" or optimum turns ratio for every job, and on this basis a number of output transformers would be required. Experience however, has shown that this "ideal" condition is not necessary in actual practice. The single output transformer arrangement, as incorporated in this design, will operate satisfactorily on practically all jobs within the output capability of the machine.

Other Features—In addition, there are many other new features incorporated in the unit described on the preceding pages. One of these that should, in conclusion, bear special attention is the Checklite system for revealing any abnormal conditions at the protective and control devices. It has already proved itself useful in service and maintenance work with personnel unfamiliar with the entire functioning of the unit. Operation of the scheme can be readily understood by referring to the schematic diagram. Fig. 6.

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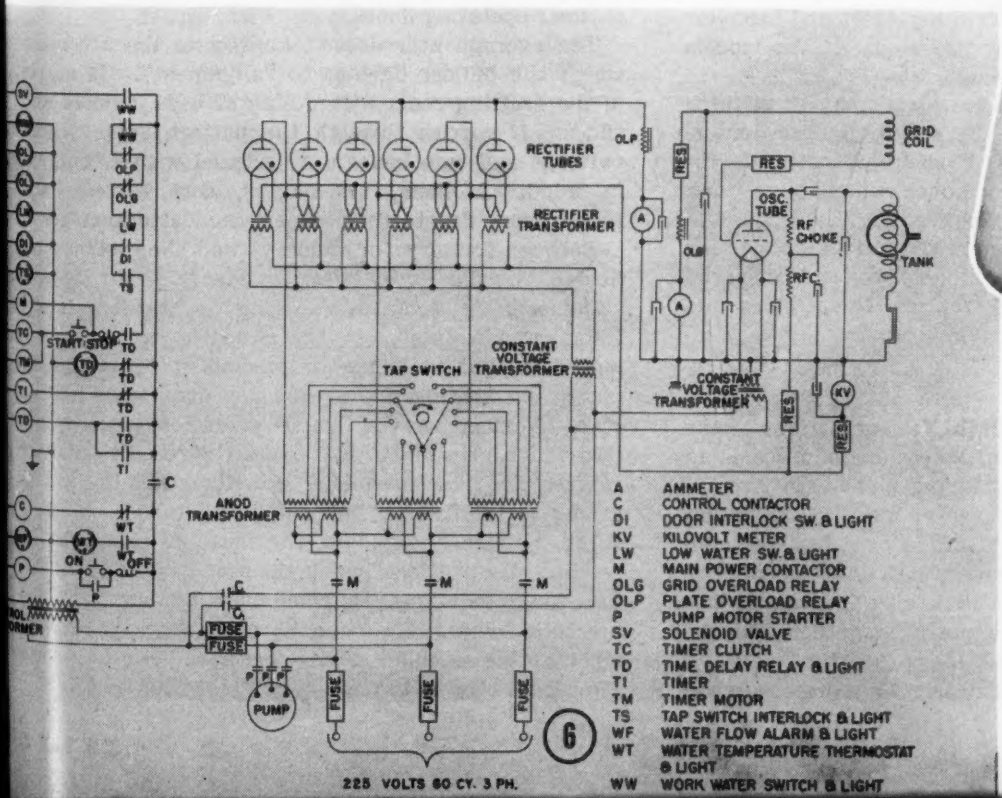
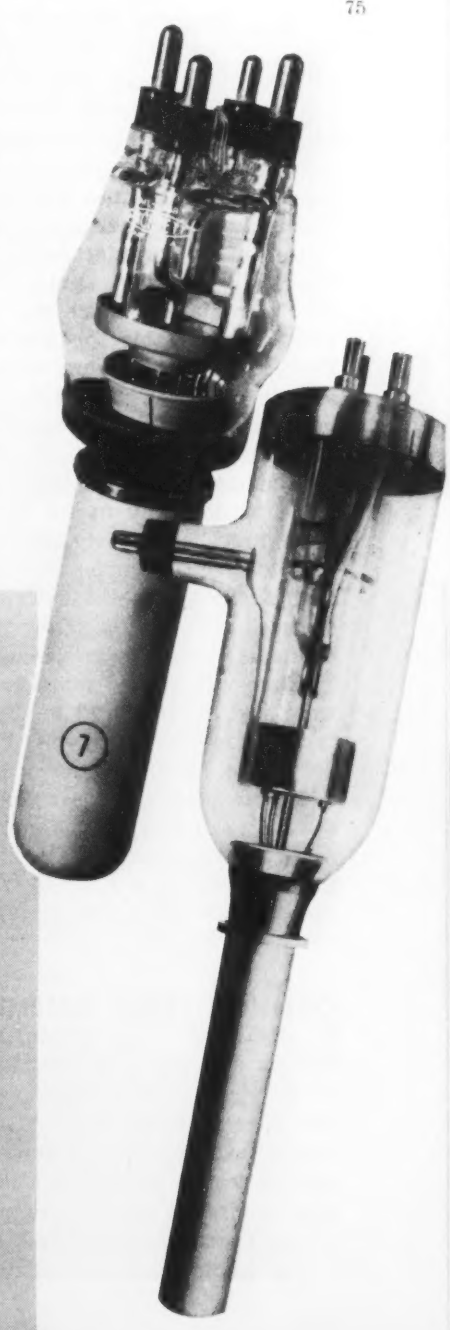
Fig. 4 — Actual 25 kw installation in a commercial heat treating shop. Fixture shown progressively hardens rods

Fig. 5 — Two-position, 25 kw unit, showing interior and closed water system

Fig. 6 — Simplified schematic circuit of a 25 kw induction heating unit

Fig. 7 — Industrial tube, left, and its radio counterpart, right





SEEN AND HEARD IN THE *Machinery Field*

By GUY HUBBARD
Machine Tool Editor

THROUGH THE CAMERA'S EYE: On a number of occasions lately, I have been impressed by the effectiveness of the photographic lens as a help to human eyes in seeing into difficult and even dangerous places in the study of industrial processes and moving machinery. This point is driven home by many of the excellent movie films being exhibited at the "Economy Theaters" at the National Metal Congress and Exposition at Cleveland this week.

"Why", one may ask, "should I study processes and machines through the eye of a camera, when I have an opportunity to study them at first hand through my own eyes?" There are several good answers to that question—the most convincing one being that the inanimate eye of the camera can "bore into" areas of activity where heat, sparks, fumes, flying chips, spray of coolant and even dangerous radiation make the climate both dangerous and uncomfortable for direct seeing. Not only can the eye of the camera bore into such places, but also it can "see" for a large group what only an individual could see if he chose to risk his eyesight through direct viewing.

In addition to safe closeups, the camera can be made to do many useful tricks such as magnifying small areas of activity—action at the edge of a cutting tool for example; slowing down rapid action—such as flow of metal under a hammer; and behavior of machinery details under stress—by plastic models operating under polarized light.

There was a time when industrial moving pictures were just another and mildly serious form of entertainment. Eventually they became educational. Today they have entered a phase where they rank with computations as practical aids in the design and application of the latest methods and equipment for metal processing. They will help you to "unlearn" unsound theories and to replace them by sound theories which readily can be translated into practice.

COMMON SENSE ASSEMBLY: As a guest of the K. R. Wilson organization, whose main office is in Buffalo and whose manufacturing plant is in Arcade, N. Y., about 40 miles southeast of Buffalo, I have just had a convincing demonstration of what common sense and the good old garden variety of mechanical ingenuity can accomplish in taking the backaches and headaches out of the putting-together and the taking-apart of mechanisms.

The whole thing started nearly 40 years ago when the late K. R. Wilson and his brother F. C. Wilson—who as general manager was my able guide through the Arcade plant—developed special holding devices and special tools for servicing Model T Ford engines and other details in their automobile repair shop. After demonstrating the efficiency of their machines and tools and methods to local people, K. R. Wilson got Henry Ford interested in the proposition—with the result that the ingenious brothers found themselves engaged in big business as manufacturers of automotive service shop equipment for the trade.

Looking at the Wilson achievements with the eyes of a machine tool man rather than those of an automobile man, I have been impressed by two things. One is the amount of useful machine per dollar which they have achieved through simplification of design and through flame cutting and welding. The other is the wide possibilities which several of their devices and machines hold for manufacturers of machinery in small and medium lots—machine tool builders for instance.

Some of the caster-equipped "roll-over" work stands which F. C. Wilson demonstrated to me in connection with engines and transmissions, would be ideal for holding headstocks, gear boxes, slides and other subassemblies "in process". Special supporting brackets are all that would be required to adapt them to such use.

F. C. Wilson also is a genius in simple adaptation of hydraulic power to simplified arbor presses, cold and hot forging and forming presses, press brakes, and—last but by no means least—to a combination push-pull machine for broaching holes. This Wilson broaching machine is deserving of a separate story. Of that, more later.

IMPORTANCE OF FOUNDATIONS: If machine tool users could spend more time in plants where their machines are built, they never would stoop to use carpenter's levels and shingles when setting machines on their operating floors.

The average user doesn't appreciate the attention which the builder devotes to "alignment". It starts in the drafting room with design of beds, frames and slides. It carries through the pattern shop, where patterns and core boxes are designed with alignment in mind. Molders, coremakers, core setters and foundrymen devote their experienced attention to it.

Between foundry (or weldery) and shop, stress relieving by aging or by heat treatment further insures alignment. In some cases aging or heat treatment follows "skin cuts". In the shop the work is supported so that no humps or permanent sets can take place, and planing and grinding is done with infinite care. Next comes the tedious operation of scraping, into which goes skill equal to that devoted to master surface plates and parallels. Finally comes the painstaking assembly and "lining up" of details.

The builder knows how the machine ought to be set up. He provides instructions and working drawings for foundations. In some cases he even provides precision levels. However, he can't force you to do right by his machine after it becomes your property. That is strictly up to you.

ROTARY GANG SLITTING

An Effective Production Tool

Importance of distinguishing between tonnage production requirements of a given plant and capacities of slitting equipment, how to avoid excessive wear and obtain best results in slitting, what design features are desirable in slitting line units, are among the subjects discussed in this third and concluding article of the series

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PART III

IN determining the size of slitter units most suitable for any given plant, the relation between the actual tonnage requirements of that plant and the potential slitter production should be taken into account, as well as the size and weight of coils, thickness of stock and number of cuts to be made to the width. In other words, it is necessary to distinguish between the capacity of a slitter in terms of tonnage it will slit per hour, and its capacity in terms of coil weights and stock dimensions that it will handle. To avoid confusion, the former is generally referred to as potential output or production and the latter generally as capacity. Choice is complicated by the fact that the potential output from any given size of slitter unfortunately is not a fixed quantity.

A daily output of 40 tons in one shop has been mentioned as good for a 36-inch standardized slitting line, with coils weighing about 5200 pounds, making eight cuts, while the average for the 14 jobs in Table III figures out to about 18 tons per day.

It must be remembered, however, that nine of these 14 jobs consisted of unusually small coils and that the best production from this medium size line in this period was nearly 45 tons per day (Job No. 3). Therefore, if it is found that the tonnage to be slit falls far short of the potential slitter production, it will be advisable to take this into account by choosing units

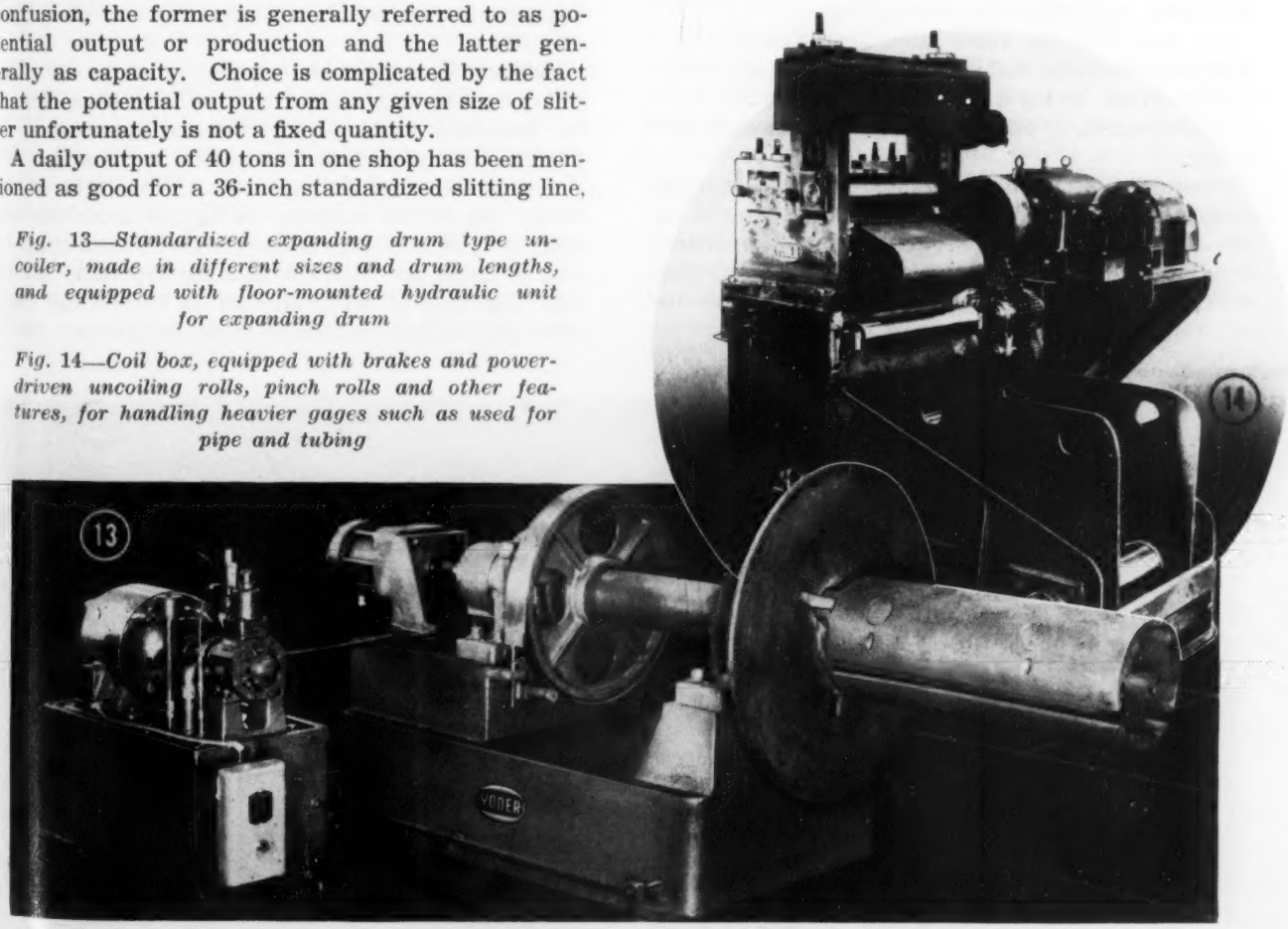


Fig. 13—*Standardized expanding drum type uncoiler, made in different sizes and drum lengths, and equipped with floor-mounted hydraulic unit for expanding drum*

Fig. 14—*Coil box, equipped with brakes and power-driven uncoiling rolls, pinch rolls and other features, for handling heavier gages such as used for pipe and tubing*

for the slitting line which are smaller rather than larger than that indicated when considering merely coil weights, stock thickness, width and number of cuts.

If, on the other hand, it is found that the slitter will probably be kept busy most of the time, a unit, or combination of units, larger than actually required may be installed so that they may use larger coils or make more cuts per width, and at the same time also provide extra capacity for future expansion of the business. Reason for giving such careful consideration to the size and capacity of slitter units will become apparent when quotations are obtained. It may make a difference of anywhere from $5 to $15,000 in the initial investment.

Coil Weight Overestimated—It has been found that many prospective purchasers not only fail to take into account the large potential capacity of multiple gang slitters, but that they are also likely to overestimate the maximum weight of coils to be handled.

Take a concrete example. A prospective buyer asks for prices on a slitting line for stock having a maximum width of 24 inches, in thicknesses up to 0.094-inch, cutting a maximum of 6 strips to the width; maximum coil weights are given as 10,000 pounds.

Dividing 10,000 by the width of 24 inches, we determine the weight per inch of width to be 416 pounds. From Table VI, we find that a coil with the core diameter of 16 inches, having a weight per inch of width of 407 pounds, would have an outside diameter of 48 inches. When this fact is discovered, everybody realizes something is wrong. Upon further investigation it is found that the largest coils heretofore used have been only 36 inches in diameter.

By consulting the same table again, we find that a 36-inch diameter coil weighs only 207 pounds per inch of width, giving a total coil weight of 207 × 24 = 4968 pounds, or only about half of the weight first stated.

Potential output of a standard slitter may be smaller than the customer's actual requirements. In this case, the choice lies between buying two slitters, or a larger one, possibly of higher speed, or of using one standardized slitting line of medium size and speed, with the addition of one or two coil cars.

Capacity Ratings — Capacity ratings of slitters should be governed, first, by arbor deflections and stresses. Shaft diameters therefore become the measuring stick. Weights and overall dimensions of the machines, as well as of important components, including motor, transmission gears, bearings, etc., must as nearly as possible be made to match.

Most slitter operators will, when occasion arises, overload their machines without serious results as to accuracy, excessive burr, or breakage of shafts and other parts. Overloading is a practice which is seldom justified, for it unduly increases wear and tear and hastens ultimate breakdowns and failures from fatigue and other causes, even under stresses and loads which appear to come within the rated capacities of the machines, as explained in the following.

Overloads and excessive wear and tear can be created by causes other than that of exceeding the capacity ratings in terms of number of cuts and thickness of stock. The causes most frequently observed are chipped and dull cutters; insufficient clearance between cutters; lack of parallelism in arbors; looseness of arbor adjusting screws due to excessive wear; excessively tight stripper fingers; folded-in edges of stock, causing edge trim cuts here and there to be made through double-thick metal; hard-to-cut special analysis metal; badly balanced cutter setups, imposing excessive loads on shafts when making a large number of cuts in heavy stock.

A combination of two or more of these conditions may create overloads sufficient to wipe out the safety factors, even when the number of cuts and stock thickness are within the safe rated capacity of slitting machines.

Balanced Cutter Setups—Operators are in the habit of trying to make all the cuts on the drive side of the machines, starting their cutter setups as close to the inside shoulders of the arbors as possible, and bunching all or most of the cuts to the right of the center line of the machine, as figured from the uncoiler side, because that seems the easiest and simplest way of doing it. There is nothing especially wrong with this kind of setup so long as theoretical loads come well within maximum rated capacities. When

Fig. 15—*Seven-roll strip flattener, for taking curve out of coiled sheets in cut-up line*

Fig. 16—*Slitter operator replacing outboard housing after change of cutter setup*

Fig. 17—*Slitter with outboard housing swung completely to one side to facilitate change of cutter setup*

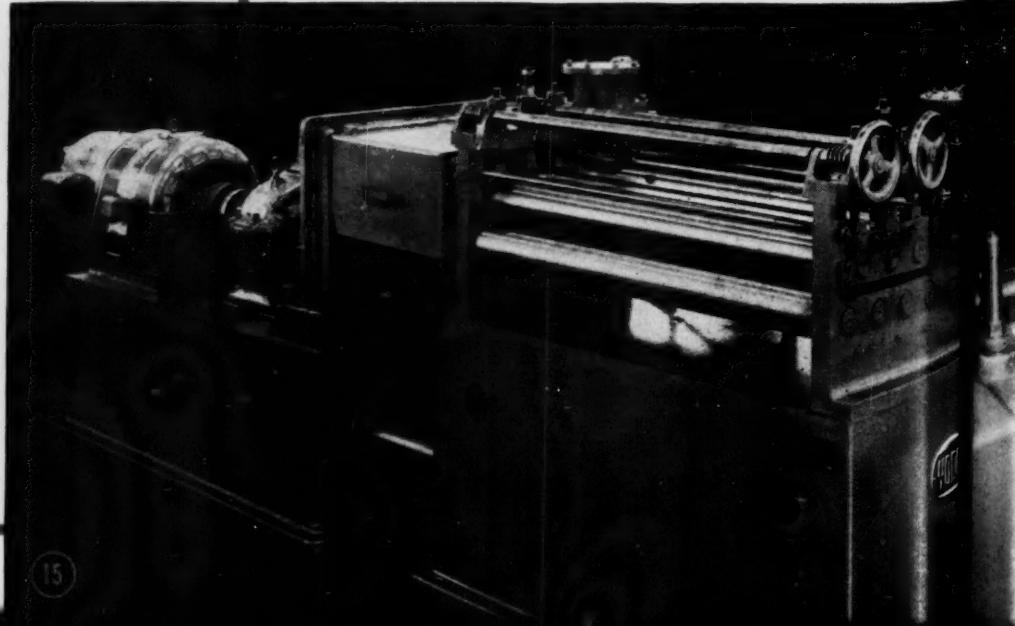


TABLE VI
APPROXIMATE WEIGHT (POUNDS) OF COLD ROLLED STEEL COILS 1 INCH WIDE

Core Diameter	Outside Diameter												
	24	26	28	30	32	34	36	38	40	44	48	54	60
12	88	106	128	151	176	203	231	260	291	358	432	554	691
16	64	84	105	129	153	179	207	237	268	335	407	529	664
18	50	70	91	115	139	165	193	223	254	321	394	516	650
20	35	55	76	100	124	150	178	208	239	306	379	501	635

TABLE VII
STANDARD SLITTING SPEEDS
PULL TYPE SLITTING LINES

Recoiler Drum Diameter Inches	Min. Speed	Maximum Speeds with Coils of Different Dia.				
		30-inch Dia.	36-inch Dia.	40-inch Dia.	44-inch Dia.	48-inch Dia.
12	168 FPM	422 FPM	507 FPM			
16	225 FPM	422 FPM	507 FPM	563 FPM	620 FPM	675 FPM
20	225 FPM	338 FPM	405 FPM	450 FPM	495 FPM	540 FPM

Note: The above minimum speeds are measured around the expanded drum circumference of recoiler at start of rewinding, while the maximum speeds are figured around the coil circumference at end of rewinding, the R.P.M. being constant through the entire operation.

these are approached, however, it is much better to distribute the load as evenly as circumstances permit to left and right of center line through the arbors.

Slightly different considerations apply to the determination of uncoiler and recoiler capacities. Here, shaft stresses rather than deflections become the limiting factor in handling heavy coils. Long life, low maintenance cost and ability to perform satisfactorily under maximum loads, depend on much the same factors as in the case of slitters.

Design Features of Slitting Line Units—Drum type uncoilers should be provided with drag brakes of sufficient capacity to function satisfactorily under normal operating conditions. One of their functions is to prevent over-running or rewinding at a faster rate than the slitting speed, another to provide the tension necessary for reasonably tight rewinding of the slit strands, and to prevent telescoping.

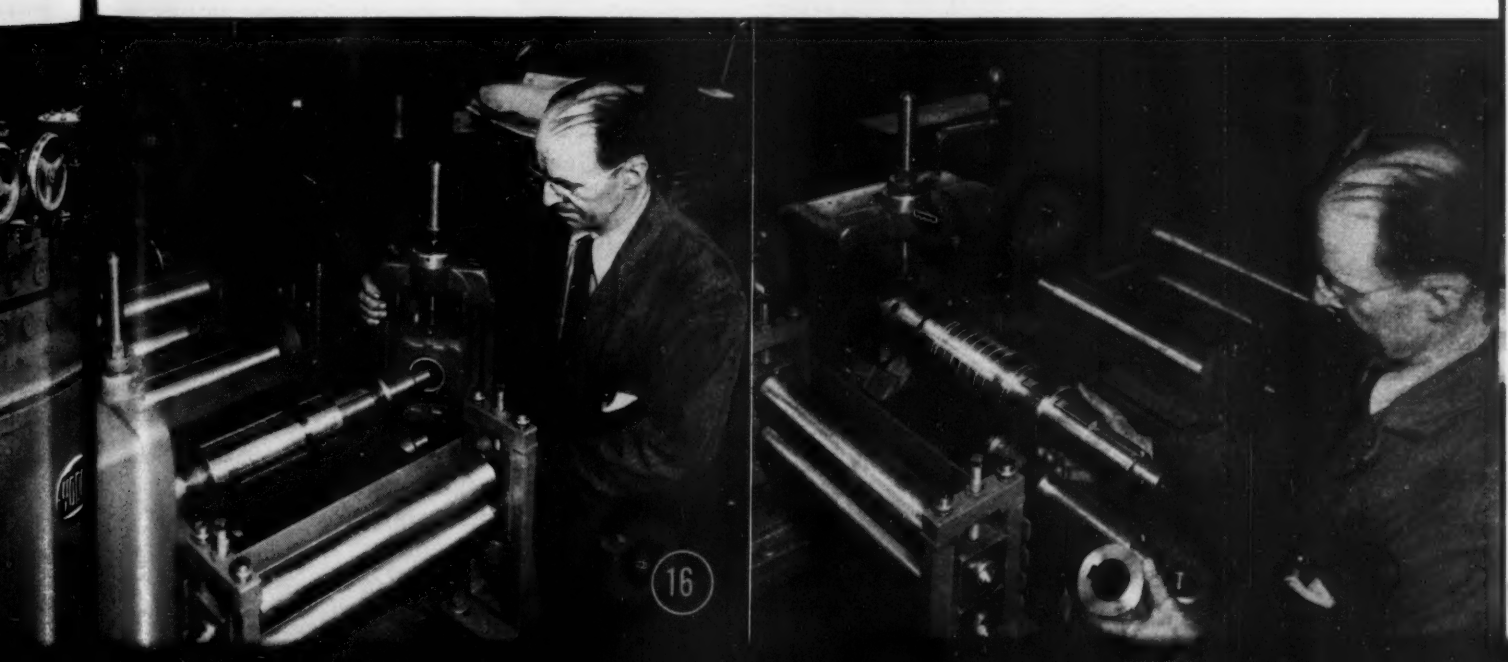
Under certain conditions a coil box may be used instead of an uncoiler. A simple coil box consists of a box enclosure having adjustable sides for different coil widths, and four or more idler rolls on which the coils revolve. Coil boxes are easier to load, besides being lower in first cost than uncoilers, but their application is limited to slow speeds, on coils of relatively small diameter and width, and on stock which is neither too thick nor too thin.

Special coil boxes, provided with brakes and power driven uncoiling rolls, pinch rolls and other features, are furnished for specific applications unrelated to slitter operation.

Miscellaneous Uses—Coil boxes and uncoilers are used not only in slitting lines, but also for feeding other production machinery, such as electric pipe or tube mills, cold roll forming, cut-up lines, and the like. When an uncoiler is installed in a cut-up line, it is usually in combination with a strip leveler and upcut shear, with a looping table between the leveler and the upcut shear for feeding thin sheets through the upcut shear.

If the leveler is used for converting coiled stock into flat sheets which must meet the usual tolerances for flatness, it will have a larger number of rolls—usually eleven or more. For stock which is fed directly into a production line, a smaller number of rolls is usually sufficient. In this case the machine is referred to as a flattener. In a flattener, only five rolls are needed.

Slitters — Standardized slitters usually include an entry table, attached to the base of the machine, mounting a pair of idler rolls and side guides, both adjustable, one to the desired height and the other to the width of stock being slit. The strip next enters the feed rolls, which are driven and separately controlled. They aid in guiding the stock straight, especially when the lead end is not cut square. They further reduce wear on the stripper fingers and help flatten the damaged edges of strip. The greater the



thickness of stock and the number of cuts to be made, the more difficult it becomes to enter the stock between the cutters without the use of feed rolls. For stock thickness over 0.040-inch feed rolls are, therefore, essential to full utilization of the machine capacity in terms of number of cuts that can be made in one pass through the machine.

Exit side of the slitter should be equipped with a pair of exit idler rolls, adjustable vertically to maintain the strip in a level position. On sheet slitters, the exit guide rolls must also serve as pull-out rolls, hence they are driven. On standard pull-type coil slitters they are simply idlers.

To save time in changing cutter setups, the ends of the arbors must be easily and quickly accessible. It should be possible to swing the outboard housing out of the way, so that the operator can change tooling in the shortest possible time. The top spindle should be equipped with a micrometer dial at each end so that the screw adjustment of the spindle can be quickly and accurately made, it being of importance to obtain true parallelism between top and bottom arbors and correct spacing between them to match varying cutter diameters and stock thicknesses.

Toggle Gearing—Although the gearing of a slitter in a pull-type slitting line is driven only for the purpose of threading, the incorporation of toggle type idlers is essential to efficient, economical performance of the machine. Toggle gears are designed to maintain full pitch line mesh of the gear teeth over the widest range of adjustments of the top arbor in relation to the bottom one. This not only reduces wear and breakage of the gear teeth but also increases useful cutter life because the arbors can be adjusted over a wider range, to compensate for gradual reduction in cutter diameters by repeated regrinding. Before buying a slitter it is, therefore, advisable to ascertain the amount of regrinding the cutters can stand before they must be scrapped.

Capacity of slitters varies with the thickness and length of the arbors, and also with the use or nonuse of removable cutter sleeves. Removable cutter sleeves are designed to reduce the idle time of the slitter where much slitting is done which requires frequent changes of cutter setups, or repeated use of the same setups. The sleeves permit separate assembly of the cutters, so that the change from one slitter setup to another can be accomplished in much less time.

Many slitters afford a choice of two different arbor diameters. The smaller diameter is always necessary when cutter sleeves are to be used. Adding thickness of sleeves, the overall diameters become identical with, and the capacities only slightly lower than, those of the larger size solid arbors. The machining of sleeves to the exceedingly fine tolerances required for this application is a difficult matter, and difficulties as well as cost increase with length. Cutter sleeves are, therefore, usually recommended only for the narrower strip widths up to 24 inches.

Smaller arbors are sometimes chosen because cutters and spacers of smaller diameters can then be used, at a saving in first cost and replacements. Cutter replacement is an item of some consequence during the lifetime of a slitter, since cutters are constantly reduced in diameter by grinding, until they have to be discarded or used for spacers.

Slitting and Threading Speeds—Minimum slitting speeds of standardized pull-type slitters are governed by the recoiler speed, which ranges from 150 to 225 fpm measured around a standard 16-inch drum.

As the minimum speed is measured around the bare drum, 168 fpm on a 12-inch drum is equivalent in revolutions per minute to 225 fpm on a 16-inch drum, if the revolutions per minute remain the same. A maximum of two or three times the minimum speed may be reached at the end of rewinding, depending on the coil diameter. It will be understood that, since the operating speed in terms of revolutions per minute is constant, the speed in feet per minute increases in direct ratio to the coil diameter as it is being built up while being rewound.

Minimum and maximum speeds for different coil diameters are given in Table VII.

While these speeds are obtained in many standardized pull-type recoilers, equipped with standard size motors and gear reducers, the same slitting lines can be equipped for almost any operating speed.

Slitters have been built for speeds upwards of 1500 fpm, but the extra cost of such slitters is not warranted except where big tonnages of large coils are to be slit, especially of light gage stock, such as tin plate and silicon steel. Even with standard speeds, a coil of average length will go through the slitter in a few minutes. Also, even with relatively low speeds, from five to ten times more time is normally spent in the other operations of loading, unloading, threading, etc. Where large tonnages are to be handled, operators therefore often find it more profitable to provide equipment for more expeditious loading and unloading of coils than to have the slitter or recoiler specially equipped for higher speed.

Sheet and Drive Slitter Speeds—Standard speed for sheet and drive slitters is (*Please turn to Page* 84)

Fig. 18—*Standardized pull-type recoilers are made in different capacities and drum lengths, with or without stripper plate. The latter is usually operated by compressed air from shop line, but may for finer control be equipped for operation from hydraulic unit on uncoiler*

SATIN FINISHING STAINLESS PRODUCTS

Architectural and decorative effects required of stainless steel in various applications present varied finishing problems whose solution may be found in utilizing coated abrasive belt polishing machines or special brush-backed finishing tools

By FRED LITTLEJOHN

Fred G. Littlejohn Co.
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PROCESSING stainless steel into consumer products and its application for architectural and decorative effect presents varied finishing problems in which coated abrasives play an important role. Product engineers have frequently encountered these problems but have not always found the ideal solutions. Difficulties center principally around the need for employing mechanical means for blending in satin finish, as received from the mill, on surface areas or spots that have been marred or stained as a consequence of arc and spot welding machining, forming or handling.

Instances where stainless is specified for tanks, ducts and trays of various types for use in chemical, petroleum, dairy product and food processing, the major problem is necessarily to eliminate all nicks, deep scratches and other surface flaws and not the attainment of a finish to lend "eye appeal." These surface defects would tend to facilitate chemical attack from acids, hydrocarbons, etc., and would also multiply the problems of cleaning to prevent contamination of products being processed through such equipment. Methods employed to finish such apparatus requires the use of grinding and abrasive impregnated rubber wheels. In a sense, the finishing of stainless does not present the wide variety of problems as do most other ferrous and nonferrous alloys. There is no need for chromium plating, anodizing, enameling or painting. The aim is to achieve a uniform satiny luster.

Belt Polishing—To accomplish this, the mill utilizes wide, coated abrasive belt polishing machines. These are usually composed of a reciprocating table upon which the sheet of steel is clamped. The sheet is moved forward and backward under an endless belt which travels vertically to the table. Another type of machine feeds off sheet strips from a spool, passes the stock under the belt and winds up the finished material on another spool. The entire abrasive area of the polishing belts that are used

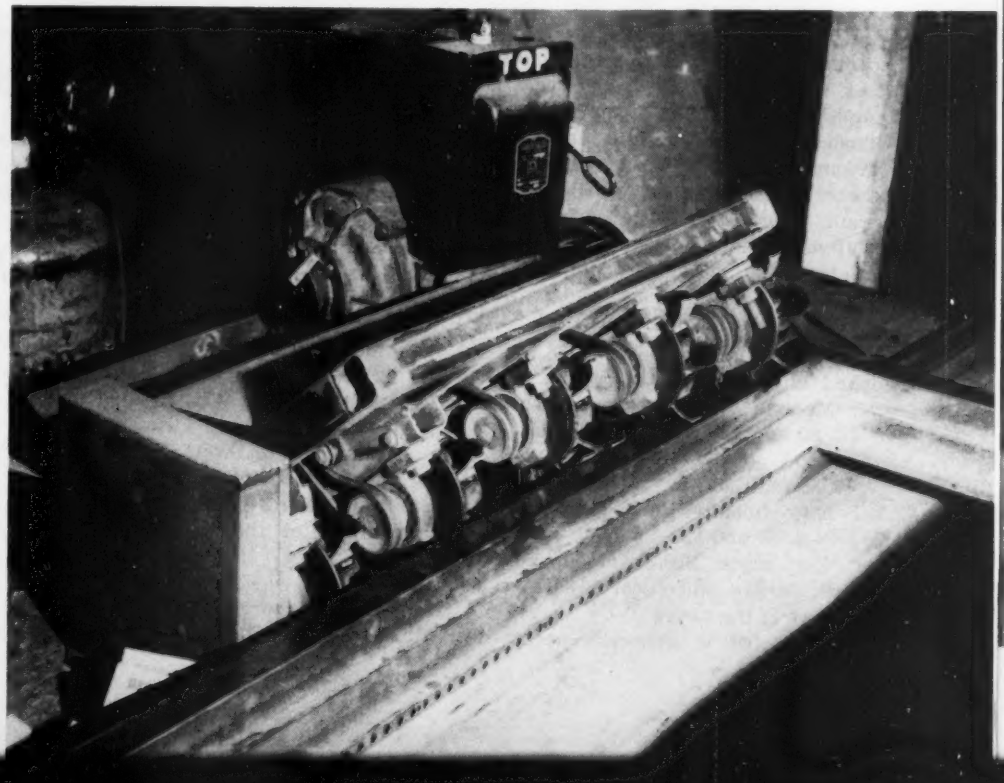

Fig. 1—Special machine constructed to satin-finish commercial refrigerator door frames. A ½-hp electric motor drives the main shaft which extends behind the full length of the frame on which the five sanding wheels are mounted. Each wheel is mounted on individual pillow blocks driven by a belt off a pulley on the main shaft. Pillow blocks are staggered diagonally across the frame in order to position the sanding wheels so they hit the contour on the outer edge of the door frame at graduated levels. Machine itself is in a fixed position. Door frame is moved along the track. Wheels turn at approximately 1200 rpm

Fig. 2—Ice cream and deep freeze cabinets are shown here being satin-finished with sanding wheels mounted on portable electric drills. Courtesy Weber Showcase & Fixture Co.

is usually greased by rubbing with a grease stick. The heat generated by contact with a special "breaking-in" sheet of steel which has also been coated with grease causes the grease to melt and spread uniformly over the grit on the belt.

Standard practice in most mills calls for the production of sheet material with a No. 4 finish, or better. Except for one instance, three operations known as rough grind, intermediate grind and polishing are required to obtain this finish. These are performed with closed coat, aluminum-oxide paper belts. The exception comes when a No. 240 closed coat, silicon-carbide paper belt, following the use of a No. 120 closed coat aluminum oxide paper belt is employed to obtain a super No. 4 finish. Grits chosen are dependent on condition of steel and no set sequence of selection is possible as a result. Normally, the following data, relative to the condition of the steel, are used in making the proper grit selection: Grit numbers used to obtain a standard No. 4 finish:

Hot rolled sheets—Nos. 36, 60 and 120

Medium grade 2B sheets—Nos. 50, 80 and 120

Good grade 2B sheets—Nos. 60, 80 and 120

Exceptionally good 2B sheets —Nos. 80 and 120

For super No. 4 finish, add grit No. 240, silicon carbide paper to any of the above.

No. 120 grit is generally accepted for final polishing, although some steel mills do use No. 150 grit.

Lubrication of Belts—Lubrication of the coated abrasive belts is of vital importance on all operations. On the rough grind, a mixture of kerosene and lubricating oil is used for the purpose of minimizing heat. This mixture is generally 50-50. Warm palm oil and kerosene are commonly used for the "intermediate" belt operation, or if the initial grind is with grit No. 60 or No. 80. Palm oil has a heavier viscosity than machine oil and kerosene. It consequently acts not only as a means of eliminating frictional heat but also of providing lubrication. This prevents abrasive marks from becoming too deep.

Individual steel mills specify the mixture of palm oil and kerosene, depending on requirements. Standards applied are based on the fact that an excess of palm oil yields superior finishes, whereas greater amounts of kerosene result in greater production life of the abrasive belts. The final polishing operation is then performed with No. 120 or 150 in conjunction with Matchless grease stick No. 2, as manufactured by Matchless Metal Polish Co., Glen Ridge, N. J.

Attainment of even high lusters is usually accomplished by polishing the sheets with belts of finer grit numbers after the No. 4 finish has been produced. In general, grits No. 180, 240 and 400 closed coat, aluminum-oxide paper belts are used. In all cases, the belts are well greased with grease stick No. 2. Surface of the steel is then further processed by polishing on an oscillating buff drum mounted over a reciprocating table. These buffs are treated with polishing compounds, thus developing a No. 7 finish. In some plants, the final coated abrasive polishing with No. 400 grit might be supplemented with an additional operation on a setup drum with No. 600 grit being used as the cutting medium. This additional operation produces a No. 8 mirror finish when followed by oscillating drum and chrome rouge.

Specialized Equipment—The obvious necessity for specialized grinding equipment is apparent by the above account of mill practice. Fabricators of stainless steel, of course, are not usually interested in setting up to perform such operations. The mill adequately produces the finished sheet stock to specification. No problems of finishing are thereby encountered by the user until he begins his operations of forming, welding, etc. A brush-backed sanding-finished tool, manufactured by Merit Products Inc., Los Angeles, Calif. may be used for blending in a satin finish on stainless after the forming and welding operations. The principle employed by this tool, designated Sand-O-Flex, involves the use of brushes merely as backing or as a cushion for the strips of coated abrasives. The latter unwind from a central cartridge inside the wheel through slots in the housing, one strip in front of each brush. The "paint brush" action of the wheel, as it turns on the shaft or spindle on which it can be attached, produces the desired finish.

Pressure exerted by the brushes is at a maximum from a point where the abrasive first strikes the surface being finished up to the point where the surface is 90 degrees to the axis of the wheel. From there on, the pressure of the brush on the abrasive strip becomes less and less until the abrasive lifts from the finished surface. Scratches left by the abrasive are in parallel lines and diminish in depth as pressure from brush lessens.

Produces Stainless Filters

QUANTITY production of permanent Oilite stainless steel filters suited to the chemical industry is taking place at the Amplex Manufacturing Co., powder metallurgy division of Chrysler Corp., Detroit.

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WALLINGFORD, CONNECTICUT, U. S. A.

Rotary Gang Slitting

(*Concluded from Page* 80)

usually about 150 fpm. What has just been said about the cost of higher speeds for pull slitters, also applies to sheet and drive slitters. Special equipment for operation at high speeds is profitable only when the tonnage to be handled is so great that it equals or exceeds the potential capacity of the standard speed machines.

Threading speed of pull slitters is usually about 150 fpm, this being the speed at which the lead end of each coil or sheet is advanced through the slitter for attachment to the recoiler drum before starting to slit at the regular operating speed. Power for threading in all cases is furnished by the slitter motor and is separately controlled.

Recoilers — Standardized recoilers are available in several sizes, the largest sizes usually rated for handling coils up to about 15,000 pounds, where low tension is required, and up to about 11,000 pounds for a tension of about 3000 pounds. The higher the tension required, the lower the weight of the coil will be which can be handled by a given size of machine.

To determine the correct size of recoiler for a pull-slitting line it is necessary first to determine the tension required, not only to pull the strip through the slitter, but also to insure reasonably tight rewinding. The first is known as slitting tension and the latter as rewinding tension. If the required slitting tension is found to be greater than the rewinding tension, it governs the choice, and vice versa. In other words, the larger figure always governs the choice.

458 Below Attained in Tests

HOW matter behaves at temperatures a fraction above absolute zero is being tested in a new cryogenics laboratory at the Westinghouse Research Laboratories, Pittsburgh. Custom-made temperatures down to 458° F below zero, and with special techniques to within one-tenth of a degree of absolute zero, 459.7° F below zero, show that the nature of matter undergoes radical changes and behaves in a mysterious manner, reports state. It has been found that liquid helium flows uphill and the flow of electricity in a wire encounters no resistance.

Many of these facts have been known for years, but the scientists are endeavoring to find out why they should happen. Normally, electricity flowing through a wire needs resistance and loses some of its power in the form of heat. If the circuit is immersed in liquid helium at a temperature of about 452° F below zero, it continues to carry current even though the source of electricity is shut off. The laboratory calls this strange behavior super-conductivity. It is thought that if it could be properly harnessed, it might mean much more efficient and cheaper distribution of electricity.

Only thirteen metals are super-conducting at subzero temperatures, it is reported. Among these are columbium, tantalum, vanadium and their alloys. A major aim of the research is to find metals or alloys that are super-conducting at higher temperatures, thus reducing the problem of refrigeration.

The laboratory takes helium gas in at one end and, in a series of steps, produces liquid helium at the other end. Its liquid temperature of 452° F below zero—about 8° above absolute zero—is reduced to a fraction of a degree above absolute zero by additional methods. All through the process electronics and mechanical controls take over, enabling the scientist to keep a constant check on the subzero temperature production. Helium is stored in tanks lining the ceiling of the laboratory. Liquid helium is returned to its gaseous form after use and recirculated into the storage tanks.

SPEED FINISHING: One of two electric hoists handling 40,000 airbrake hose clamps per week through finishing operations at Union Switch & Signal Co., Swissvale, Pa., is shown operating between a caustic tank and a tumbler. Trolley-mounted, on a jib, the hoist moves the clamps from step to step in metal buckets. On an overhead I-beam and similarly-mounted is another electric hoist, also made by Yale & Towne Mfg. Co., Philadelphia. The second hoist services sulphuric acid, cold water, soda-ash, cold water, cyanide, zinc plating, hot water and steam-drying equipment after caustic and tumbling operations

Air Force Selling Guide Offered

PROCEDURES which any organization with goods and services to sell to the United States Air Force can follow to insure fair and impartial consideration in contract bidding are outlined in a booklet, "A Guide for Selling to the United States Air Force" available at the seven Air Materiel Command field procurement offices. Addresses of the offices are: New York AF Procurement Field Office, 67 Broad St., New York 4, N. Y.; Dayton AF Procurement Field Office, Wright-Patterson Air Force Base, Dayton, O.; Ft. Worth AF Procurement Field Office, Government Aircraft Plant No. 4, Fort Worth 1, Tex.; Detroit AF Procurement Field Office, W. Warren and Lonyo Aves., Detroit 32, Mich.; Chicago AF Procurement Field Office, 209 W. Jackson Blvd., Chicago 6, Ill.; Boston AF Procurement Field Office, Boston Army Base, Boston 10, Mass.; Los Angeles AF Procurement Field Office, 155 W. Washington Blvd., P. O. Box 3849, Terminal Annex, Los Angeles, Calif.

Stud Welding Speeds Installation

ELECTRIC-ARC stud-welding has been adopted for the attaching of 0.032-inch industrial corrugated aluminum roofing and siding direct to structural steel framing members, according to Reynolds Building Products Division, Reynolds Metals Co., Louisville, Ky. Inasmuch as the stud welding method, developed by Nelson Stud Welding Division, Morton Gregory Corp. is fast, it offers possibilities in reducing application costs, the company states.

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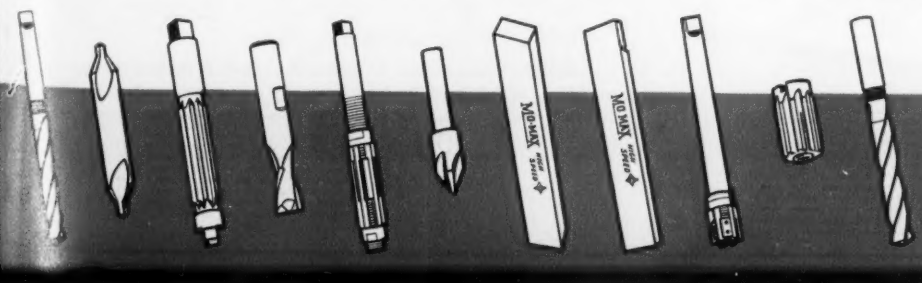


FUNDAMENTALS OF STEELMAKING

NUMBER **14** OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

By BRYANT BANNISTER
Consulting Engineer
National Tube Co.
Pittsburgh

Production of

Seamless Steel Pipe and Tubes

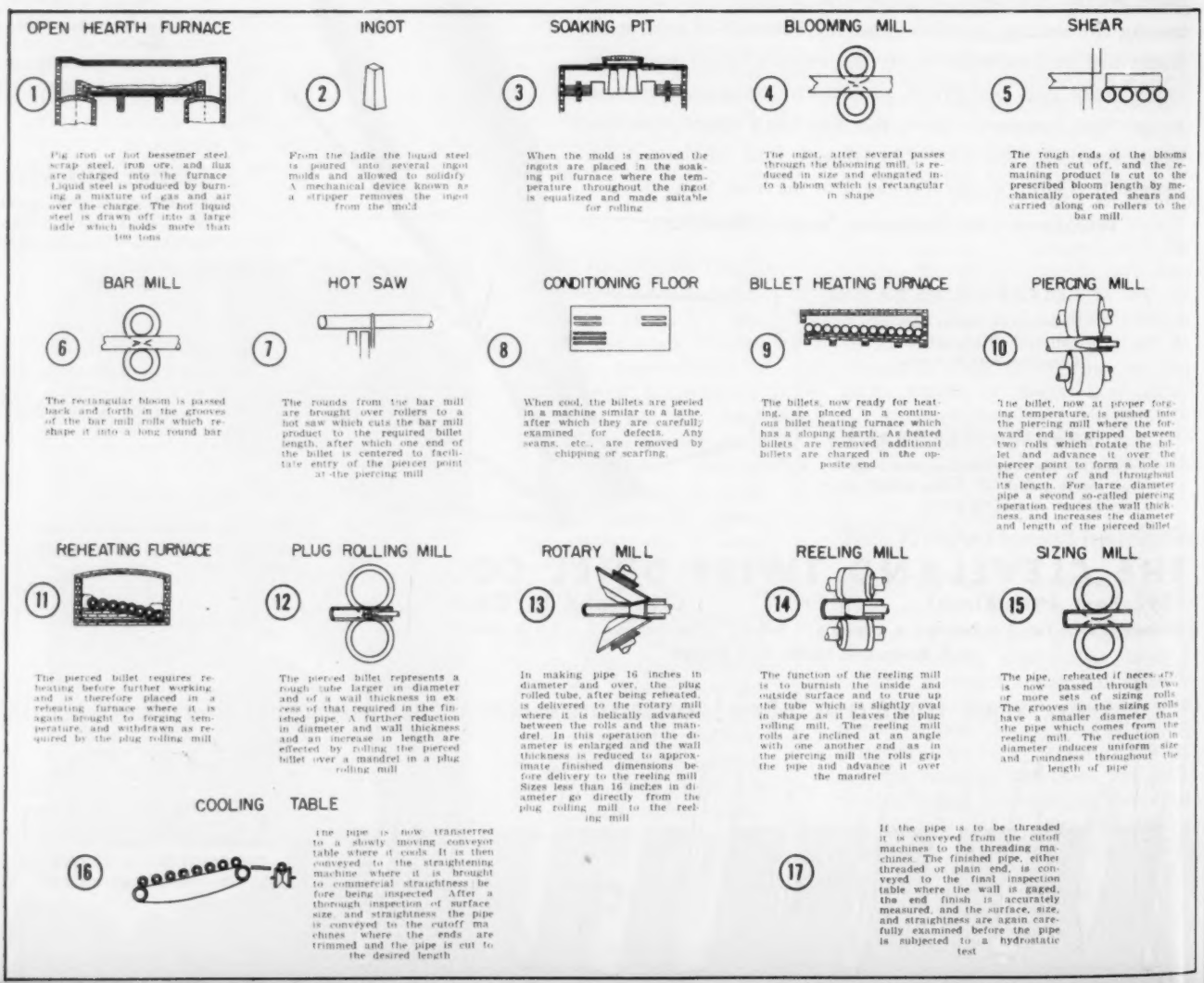
Production of seamless tubular products has advanced immeasurably from the first crude processes utilized over 60 years ago. Today's processes and equipment are highly intricate and reflect the best in engineering knowledge and design

PART I

MANUFACTURE of seamless tubular products dates back to 1885 when the Mannesmann brothers in Germany discovered that reducing the diameter of a solid round bar by cross rolling between two rolls tended to produce a ragged opening along the longitudinal axis of the bar. It was the a logical step to introduce a mandrel or point over which the bar was rolled, thus forming a cylindrical shell. This operation is termed piercing a billet and is still employed as the first step in the fabrication of the major tonnages of seamless steel pipe. The following description contemplates the use of a roll-type piercing mill.

Fig. 1 illustrates diagrammatically what is involved in converting molten steel to pipe ready for the finishing operations. Open hearth steel is ordinarily the basic material, although with the exception of the

Fig. 1—Sequence diagram illustrating steps involved in the conversion of molten steel into pipe ready for finishing operations


OPEN HEARTH FURNACE
1
Pig iron or hot bessemer steel, scrap steel, iron ore, and flux are charged into the furnace. Liquid steel is produced by burning a mixture of gas and air over the charge. The hot liquid steel is drawn off into a large ladle which holds more than 100 tons
INGOT
2
From the ladle the liquid steel is poured into several ingot molds and allowed to solidify. A mechanical device known as a stripper removes the ingot from the mold
SOAKING PIT
3
When the mold is removed the ingots are placed in the soaking pit furnace where the temperature throughout the ingot is equalized and made suitable for rolling
BLOOMING MILL
4
The ingot, after several passes through the blooming mill, is reduced in size and elongated into a bloom which is rectangular in shape
SHEAR
5
The rough ends of the blooms are then cut off, and the remaining product is cut to the prescribed bloom length by mechanically operated shears and carried along on rollers to the bar mill
BAR MILL
6
The rectangular bloom is passed back and forth in the grooves of the bar mill rolls which reshape it into a long round bar
HOT SAW
7
The rounds from the bar mill are brought over rollers to a hot saw which cuts the bar mill product to the required billet length, after which one end of the billet is centered to facilitate entry of the piercer point at the piercing mill
CONDITIONING FLOOR
8
When cool, the billets are peeled in a machine similar to a lathe, after which they are carefully examined for defects. Any seams, etc., are removed by chipping or scarfing
BILLET HEATING FURNACE
9
The billets, now ready for heating, are placed in a continuous billet heating furnace which has a sloping hearth. As heated billets are removed additional billets are charged in the opposite end
PIERCING MILL
10
The billet, now at proper forging temperature, is pushed into the piercing mill where the forward end is gripped between two rolls which rotate the billet and advance it over the piercer point to form a hole in the center of and throughout its length. For large diameter pipe a second so-called piercing operation reduces the wall thickness and increases the diameter and length of the pierced billet
REHEATING FURNACE
11
The pierced billet requires reheating before further working and is therefore placed in a reheating furnace where it is again brought to forging temperature, and withdrawn as required by the plug rolling mill
PLUG ROLLING MILL
12
The pierced billet represents a rough tube larger in diameter and of a wall thickness in excess of that required in the finished pipe. A further reduction in diameter and wall thickness and an increase in length are effected by rolling the pierced billet over a mandrel in a plug rolling mill
ROTARY MILL
13
In making pipe 16 inches in diameter and over, the plug rolled tube, after being reheated, is delivered to the rotary mill where it is helically advanced between the rolls and the mandrel. In this operation the diameter is enlarged and the wall thickness is reduced to approximate finished dimensions before delivery to the reeling mill. Sizes less than 16 inches in diameter go directly from the plug rolling mill to the reeling mill
REELING MILL
14
The function of the reeling mill is to burnish the inside and outside surface and to true up the tube which is slightly oval in shape as it leaves the plug rolling mill. The reeling mill rolls are inclined at an angle with one another and as in the piercing mill the rolls grip the pipe and advance it over the mandrel
SIZING MILL
15
The pipe, reheated if necessary, is now passed through two or more sets of sizing rolls. The grooves in the sizing rolls have a smaller diameter than the pipe which comes from the reeling mill. The reduction in diameter induces uniform size and roundness throughout the length of pipe
COOLING TABLE
16
The pipe is now transferred to a slowly moving conveyor table where it cools. It is then conveyed to the straightening machine where it is brought to commercial straightness before being inspected. After a thorough inspection of surface, size, and straightness the pipe is conveyed to the cutoff machines where the ends are trimmed and the pipe is cut to the desired length
17
If the pipe is to be threaded it is conveyed from the cutoff machines to the threading machines. The finished pipe, either threaded or plain end, is conveyed to the final inspection table where the wall is gaged, the end finish is accurately measured, and the surface, size, and straightness are again carefully examined before the pipe is subjected to a hydrostatic test

MAINTENANCE CUT

Several Thousand Dollars Per Year with **KAOCAST**

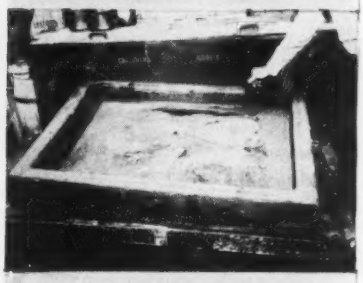
Photographs courtesy Ford Motor Company

A large automobile manufacturing firm found that high temperatures and severe operating conditions were playing havoc with the doors of their 15-ton electric furnaces. Run 16 hours a day, 5 days a week, these furnaces are poured every 2½ hours and are charged twice during each cycle. With a good grade of firebrick, furnace door linings lasted an average of only two or three days before replacements were necessary.

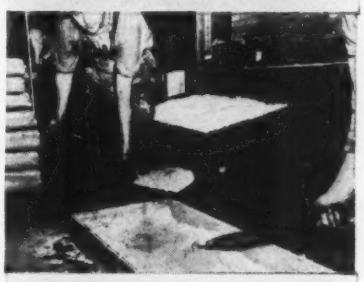
A trial installation of KAOCAST—the B&W high temperature Refractory Castable—was made. The KAOCAST doors stood up two to three weeks . . . *five to eight times longer than firebrick.* As a result, doors on all electric furnaces of this type are now lined with KAOCAST. *Savings in maintenance are running into thousands of dollars per year.*

Your B&W Refractories Engineer will be glad to show how KAOCAST will cut your furnace operating cost. Write or call him today.

KAOCAST, easy to use as ordinary concrete, can be mixed in mortar box or concrete mixer.



Shell of furnace door, cleaned, ready for installation of KAOCAST.



Shoveling KAOCAST into place. KAOCAST can also be poured like ordinary concrete, plastered in place, or applied with a cement gun.

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The author, Bryant Bannister, was born in Illinois in 1887. He received his bachelor of science degree from the University of Illinois and subsequently took a year's graduate work at Massachusetts Institute of Technology. While in college he was elected to Tau Beta Pi, national honorary engineering society.

He started with National Tube Co. as a draftsman in 1912, becoming power engineer in 1915. He held this position until 1932 except for a one year period spent as power engineer for the United States Steel Corp., Ordnance Dept. In 1932 he was appointed assistant to the vice president of National Tube Co. in charge of process development engineering. In 1944 he was named consulting engineer, which position he holds today.

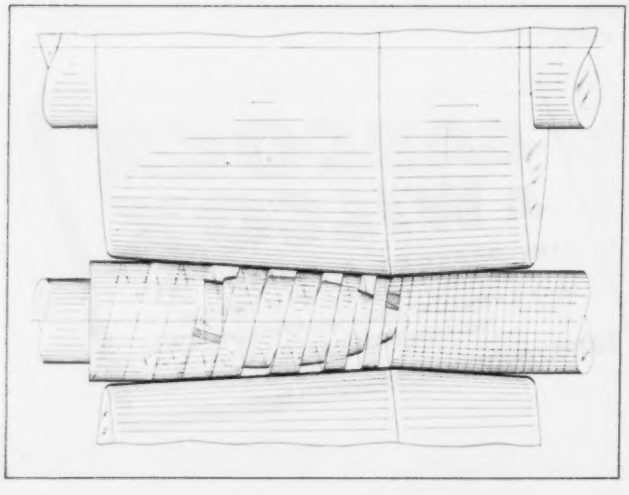
He is the inventor of many processes and devices largely pertaining to steel pipe manufacture. Perhaps the best known item is the geometric piercing pass used almost exclusively by the seamless pipe industry.

first diagram, the same sequence of operations would be employed in producing seamless pipe from deoxidized acid bessemer steel.

Legends beneath the diagrams indicate the general function of each operation. The first six diagrams illustrate operations that are common to most steelmaking units. The seventh diagram, illustrating the hot sawing of rounds, is common to many other processes. However, preparing the round for piercing introduces the first innovation. To facilitate entry of the piercer mandrel or point into the round during the piercing operation, a central cup-shaped cavity is impressed in one end of the billet or round while hot.

After the rounds have cooled, they are inspected and conditioned. This operation is quite critical, because thorough removal of surface defects is necessary to

Fig. 2—Geometric piercing pass which is used substantially by all seamless pipe manufacturers today



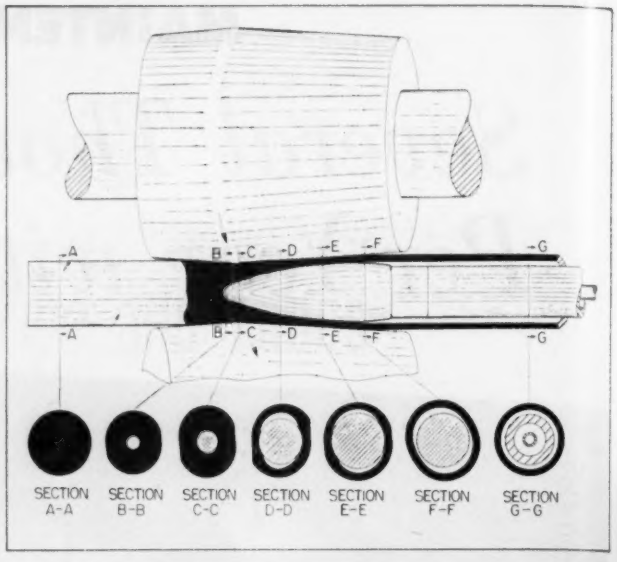


Fig. 3—Piercing operation—showing various cross-sections of material during pass

eliminate seams which would carry through to the finished pipe, causing rejection.

The billet heating furnace illustrated is of the conventional roll down type wherein billets are slowly rolled by gravity and manual control down the hearth towards a discharge door. Greatest objections to this type of furnace are the high cost of labor involved and the uncertainty that in rolling the billet, all surface areas are exposed to the same heating effect. Obviously, a uniform temperature across the billet section is necessary for proper piercing action. This varies for the type of steel being processed, ordinarily being approximately 2200° F.

In recent years, the rotary hearth type of furnace has been developed. In this furnace, the billet is placed on a hearth which rotates, billets being spaced by at least one billet diameter. This method allows radiant exposure, either direct or by reflection from the hearth, to the entire billet surface at all times. The billet travels through three or more heating zones which are automatically controlled to provide proper temperature conditions throughout the travel from charge to discharge doors. Thus, all billets are subjected to the same heating cycle and sufficient time is provided to insure temperature uniformity. Operation of a rotary hearth furnace requires approximately five less men than does a roll-down furnace.

Recently, consideration has been given to a furnace for heating billets which comprises a straight-line series of barrels equipped with radiant type burners. Material is carried through this tunnel-like structure on rolls which are slightly skewed, causing the billets to turn slowly as they proceed through the furnace. Rate of radiant heat input is extremely high, thereby shortening the time of exposure to oxidation and minimizing scale loss. Operating labor is reduced to a minimum. This type of furnace has not been completely commercialized as yet but appears to have all the advantages of the rotary hearth furnace, plus low installation cost and maintenance expense.

We now come to the piercing operation which, for a great many years, departed only in minor details

from the earliest conception of what was required to pierce a billet. Designers, or perhaps the mill operators, would make individual changes such as in roll profiles or the piercing mandrel without due regard to the overall effect of such a change, the result being that metal flow from the inlet to the outlet of the piercing pass was far from orderly. For example, in one section of a pass, the action might be to feed metal forward at a greater rate than an advanced section could absorb it. In some instances, the reverse action took place. This push and pull action had the effect of causing abnormal stresses to be set up in the billet which showed up as defects such as seams, laps, tears, etc., and generally slowed down billet travel through the pass.

To improve the piercing operation, a detailed study was made around 1934, resulting in development of the so-called "geometric pass" which, with slight modification is today employed by substantially all seamless steel pipe manufacturers.

Fundamentally, the geometric pass is based upon the fact that in the piercing operation, the same volume of metal per unit of time must pass any transverse section of the pass. The pass is the combination of the two power driven barrel shaped rolls whose axes are in planes parallel to but inclined in opposite directions to the geometrical axis of the

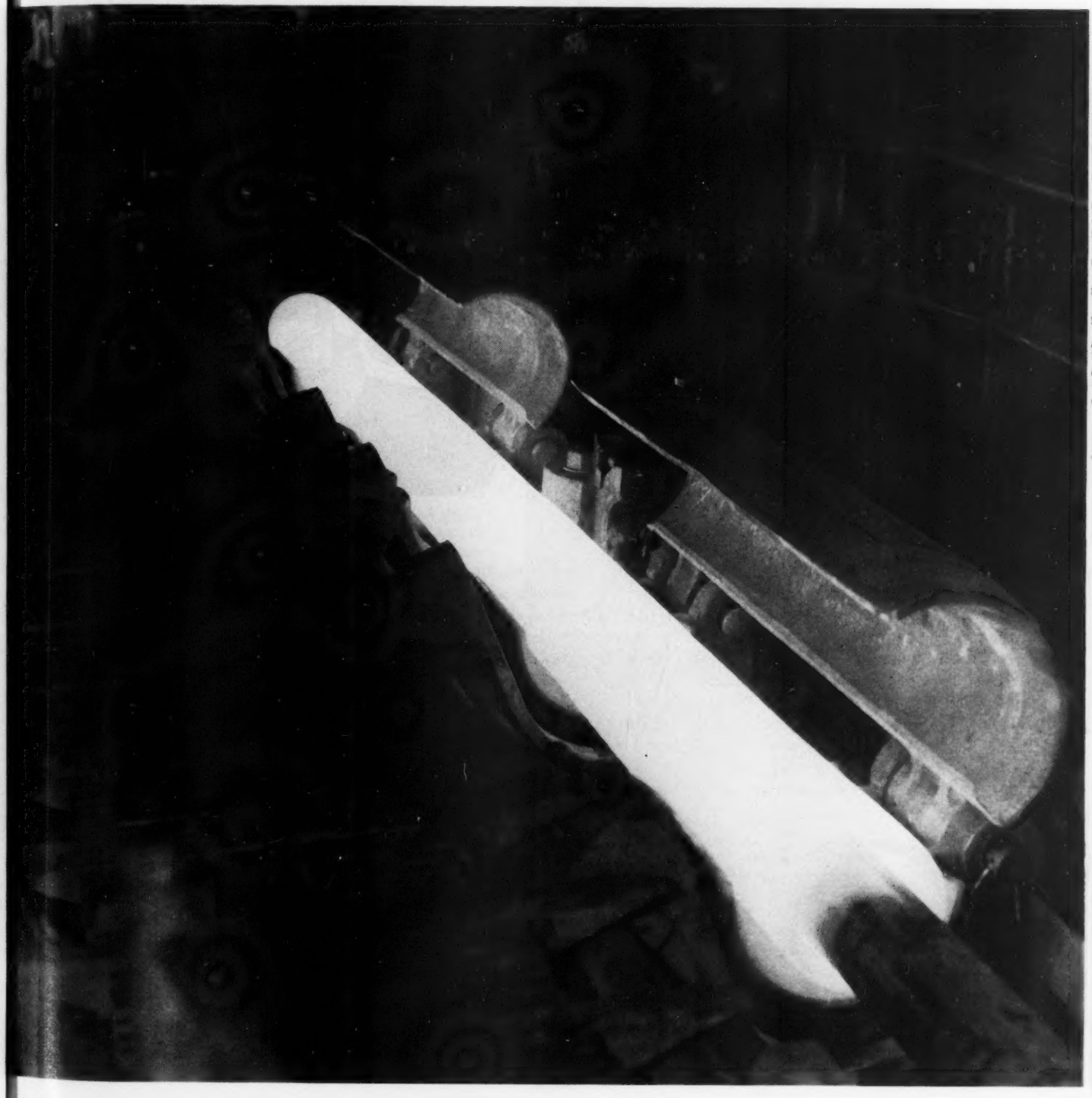
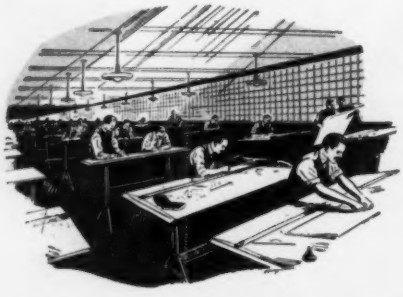


Fig. 4—View of billet after being pierced and before thrust bar has been withdrawn

A note on Abrasives

Improved Abrasive Tools help step up production...cut costs

New production efficiencies and economies are being realized almost daily as a direct result of technical advances in abrasive products. At The Carborundum Company these improvements do not just "happen." They are derived from a carefully formulated program. Product Development... an important activity here... pools specialized knowledge, experience and skill. It probes into the performance of present products... seeks and finds possibilities for doing the job better. It examines and compares the action of bonded and coated products under every conceivable production condition. It studies and restudies technical advances in machines and methods. CARBORUNDUM'S development staff turns up ideas that can be incorporated into new products as well as better ways of using present products. Both are important to production management. As a user of abrasive products by CARBORUNDUM, you receive the direct benefit of all advances in product development. This —together with abrasive engineering and other services—offers another reason for specifying and buying abrasive tools produced by CARBORUNDUM ... the leading name in abrasives. The Carborundum Company, Niagara Falls, New York.



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Engineering News
ON ABRASIVE PRODUCTS

Belt Backstand Idler Techniques Effect Operating Cost Reduction

Substantially increased output, lower unit costs and improved finishes are influencing more metal working plants to switch to belt backstand idlers for grinding and finishing flat and contoured surfaces of both small and medium weight pieces. In many factories where set-up wheels were formerly used, conversion from 25 to 100% to the backstand technique has been effected. While these methods normally involve grinding speeds of 6500 to 7000 SFPM with glue-bonded abrasive cloth belts, speeds of 10,000 SFPM are being used widely today with resin bonded belts.

As a result of recent wide-spread experiences with belt backstand idler techniques, our trained staff of engineers is equipped to guide users in making the best use of this equipment. In all cases they are able to recommend applications and abrasive materials to meet your requirements.

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Cylindrical grinding wheels including crankshaft wheels by CARBORUNDUM are engineered to provide the tools required for maintenance of efficient production rates, rapid stock removal and fine surface finish.

V11 bond represents the most recent contribution to this class of grinding. These wheels are designed with a *specific structural balance* which when combined with the proper grain size and abrasive type offers the following advantages to both operator and management:

1. Cool and free cutting characteristics promote more efficient production of superior finishes and close tolerances. This is of great importance in operations involving both OD and shoulder or face grinding.
2. Designed structural balance permits continuous fast cutting rates which promote high production.
3. Fast cutting qualities combined with long life save dollars in operator and machine time as well as abrasive costs.
4. Engineered uniformity of the abrasive and bond components of these wheels permits close control of part size and form.
5. Self dressing characteristics provide longer periods of use between dressings . . . save dressing time, usable abrasive and dressing tools.
6. Ability to grind a wide range of materials makes possible savings in inventories of special wheels and minimizes requirements for premium priced abrasives.
7. Savings in set-up time are made possible because the versatility of V11 bond wheels permits efficient grinding of many varieties of work, making it unnecessary to change wheels when changing from one job to another.

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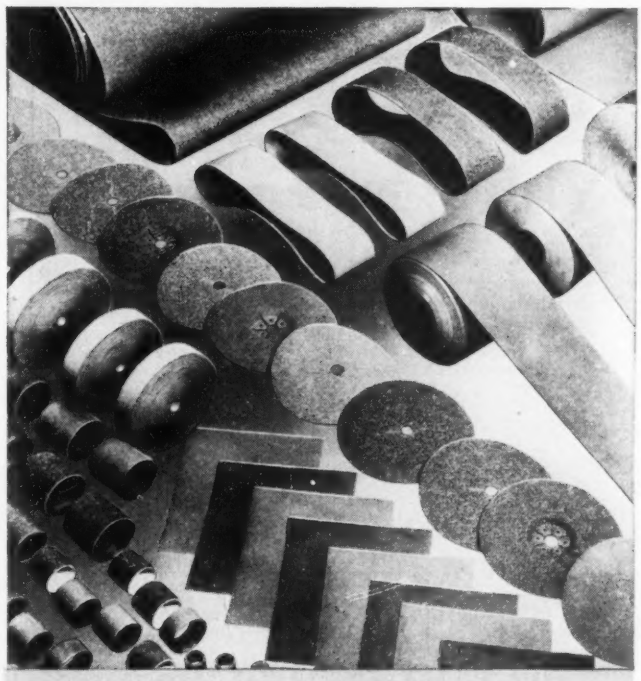

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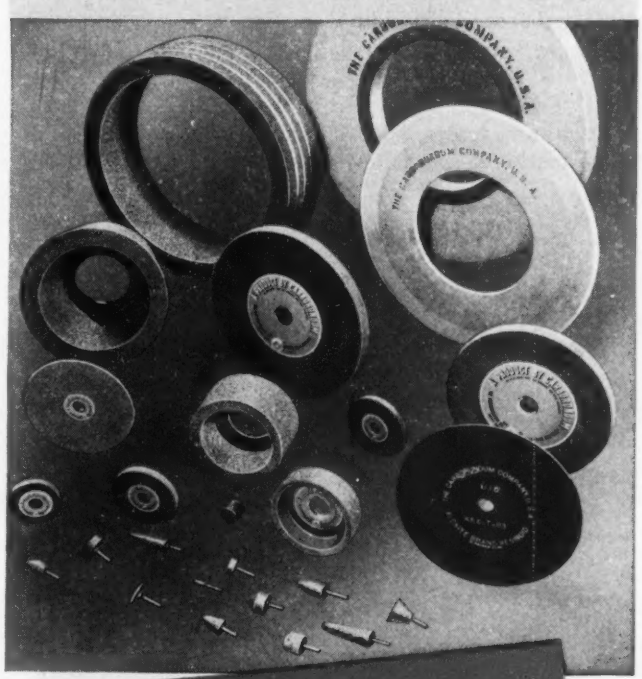

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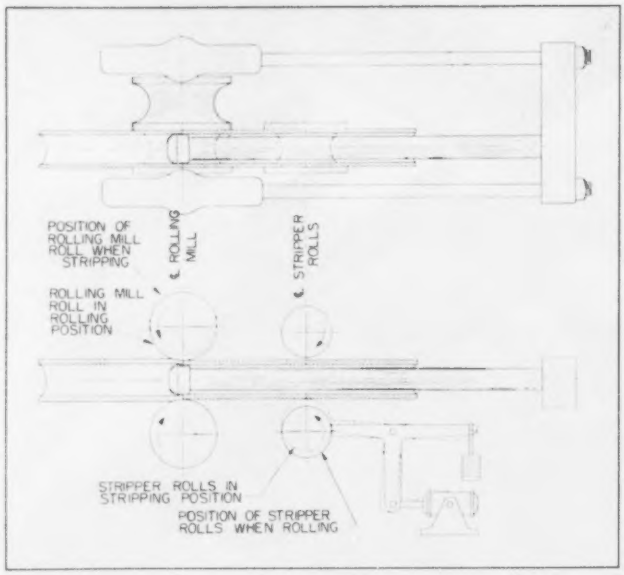
POSITION OF ROLLING MILL ROLL WHEN STRIPPING
ROLLING MILL
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ROLLING MILL ROLL IN ROLLING POSITION
STRIPPER ROLLS IN STRIPPING POSITION
POSITION OF STRIPPER ROLLS WHEN ROLLING

Fig. 5—Diagrammatic sketch of plug rolling operation

mill to provide a feeding effect for the billet which is squeezed and rotated between the rolls. A piercing point disposed between the rolls, the nose or forward end of which is first contacted by the billet, is located slightly ahead of the gorge or narrowest portion of the pass. This point is supported on the forward end of the thrust bar which is free to rotate but restricted from longitudinal movement. Piercing mill shown in the sequence diagram and Figs. 2 and 3 illustrate the above arrangement. Not shown but equally essential to proper functioning of the pass are two stationary guide shoes positioned above and below the billet to locate it in proper vertical position and to limit radial flow of the metal. Without this limiting feature the billet would expand unduly and quite improper speed relationship between billet and rolls would be set up.

The term "geometric" is descriptive of the rate at which the billet accelerates in forward travel through the pass. Since the volume of metal flowing forward in the pass is constant at each transverse section, it is only neceessary to so proportion the pass elements, described above, that the section area for metal flow decreases towards the outlet at the same rate as it is desired to increase the forward velocity of the billet. For convenience, the advance of the billet for each revolution in the pass is taken as an increment of forward travel. It is obvious that if the cross-sectional area of the pass is decreased by any given amount, the forward velocity of the metal must increase by the same percentage. Thus, if for each increment of billet advance it is desired to increase the velocity according to the law of geometrical progression, it is necesesary that the difference between successive increment areas be multiplied by a constant greater than one. Advance of the billet from inlet to outlet of the pass is, therefore, accelerating in velocity. Fig. 2 illustrates the incremental advance. Thus, no section of the pass can be retarding the preceding sections. Soundness of this development was demonstrated by the great increase in delivery speed of the piercing mill with no increase in peripheral speed of the rolls or feed angle. Another proof of correctness is the ability to process lower cost steel and to produce at a substantially increased rate.

When the rear end of the solid billet has advanced through the pass, a thrust bar over which the pierced billet has telescoped, is withdrawn and billet is "kicked out" of the piercer outlet and transferred to the next operation. Fig. 4 shows a billet after being pierced and before the thrust bar has been withdrawn.

For pipe diameters greater than about 4½ inches, it is customary to perform a second so-called piercer operation which further expands, reduces the wall thickness and elongates the pierced billet. This operation is quite similar to the first piercing operation and is performed on similar equipment. The pass dimensions, of course, are altered to suit the larger diameter product.

Billets, whether single or double pierced, are next processed through a plug rolling or Hi-Mill as it is sometimes called. Before being plug rolled, it is customary to raise billet temperature to about 2200° F. This is especially necessary after double piercing. The furnace generally employed for this reheating is of the roll across type as illustrated in No. 11 of the diagram. Here again, the radiant heat tunnel-type furnace described for heating solid billet deserves consideration.

The plug rolling mill indicated in the diagram, No. 12 and Fig. 5, is a relatively simple unit comprising a pair of horizontal grooved driven rolls vertically in line, a thrust bar to support the removable cylindrical plug and a pair of stripper rolls driven in a direction opposite the main rolls. The upper main roll is adjustable vertically, generally by means of a large hand-wheel operating a screw for fine adjust-

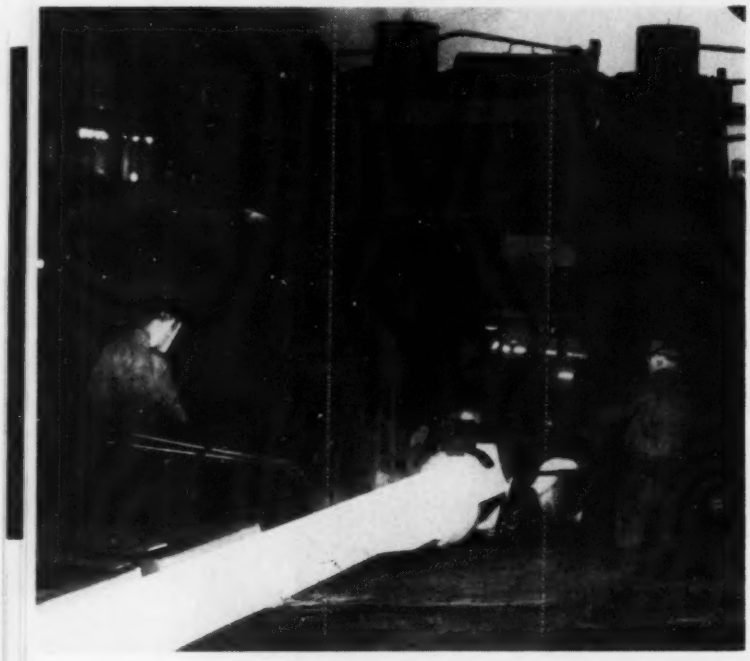


Fig. 6—View of plug rolling mill producing 26-inch OD pipe

Plymetl

The material that's making news today

For over twenty-five years, Plymetl — a Haskelite material — has helped designers and engineers build greater performance, durability and sales appeal into their manufactured products. Its use eliminates deadweight, and makes complicated framing members and fastenings unnecessary. There is only one Plymetl . . . Haskelite Plymetl . . . with its performance proved. A material of many advantages, Haskelite Plymetl is easily worked with simple metalworking or woodworking tools. It can often save man-hours to a point where the final cost of the product may be noticeably reduced. The unique strength and weight characteristics of Plymetl are graphically described in the chart below. Write for complete data and samples of Plymetl.

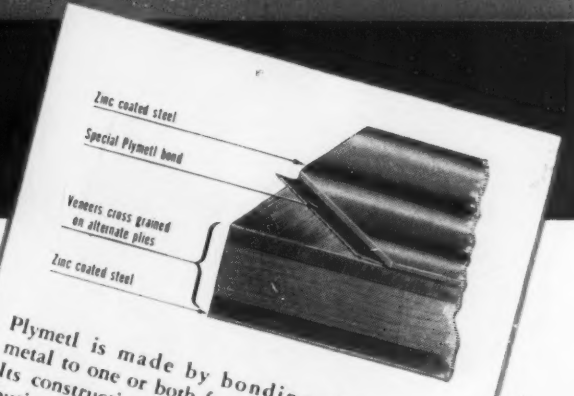
	PLYMETL UVU			STEEL U.S. STD. GAUGES			ALUMINUM B & S STD. GAUGES		
	1/4"	5/16"	3/8"	20 ga.	16 ga.	12 ga.	10 ga.	8 ga.	6 ga.
Weight in lbs. per sq. ft.	1.01	1.17	1.43	1.5	2.5	4.37	1.44	1.81	2.28
Stiffness factor E I in.² lbs.	4,900	8,400	13,200	124	575	3,050	872	1,760	3,500

	PLYMETL EVE			STEEL U.S. STD. GAUGES			ALUMINUM B & S STD. GAUGES		
	1/4"	5/16"	3/8"	20 ga.	16 ga.	12 ga.	10 ga.	8 ga.	6 ga.
Weight in lbs. per sq. ft.	2.25	2.40	2.56	1.5	2.5	4.37	1.44	1.81	2.28
Stiffness factor E I in.² lbs.	17,000	28,000	43,000	124	575	3,050	872	1,760	3,500

In the chart above, note that a 5/16" EVE Plymetl panel (zinc-coated steel two sides) weighs 2.40 lbs. per square foot. This is less than the weight of 16-gauge steel. However, the resistance to bending of the Plymetl panel is about 50 times as great!

Where rigidity is of prime importance, consider the following: A 3/8" UVU Plymetl panel (aluminum two sides) weighs 1.43 lbs. per square foot. The weight of 20-gauge steel is 1.5 lbs. per square foot. The Plymetl panel, though lighter in weight has 100 times the stiffness of the sheet steel.

In computing the values of Plymetl, the following is assumed: (1) The modulus of elasticity of steel, 30,000,000 lbs. per sq. in. (2) The modulus of elasticity of aluminum, 10,000,000 lbs. per sq. in. (3) The modulus of elasticity for the core material, 1,300,000 lbs. per sq. in. along the grain. 65,000 lbs. per sq. in. across the grain. (4) The thickness of steel and aluminum, .021" (27 ga.) and .015", respectively. (5) The weight of plywood plaque, 30 lbs. per cu. ft.



Plymetl is made by bonding thin sheets of metal to one or both faces of a plywood plaque. Its construction effects the most efficient distribution of these materials, combining high strength qualities of the metal surfaces with low density of woods. Result: Plymetl makes an ideal structural material, simulating an I beam with the metal surfaces taking the part of the flanges and the light weight plaque acting as the web.

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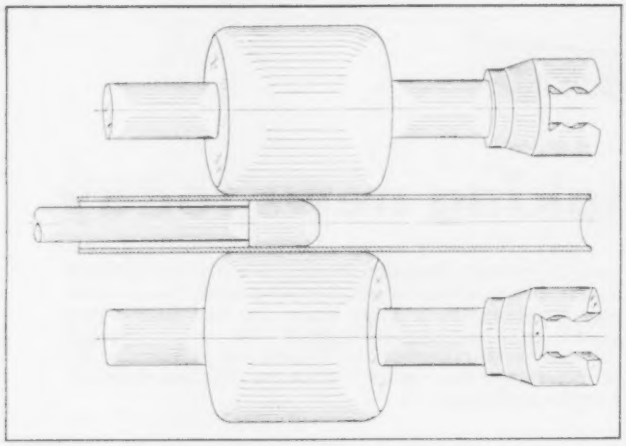
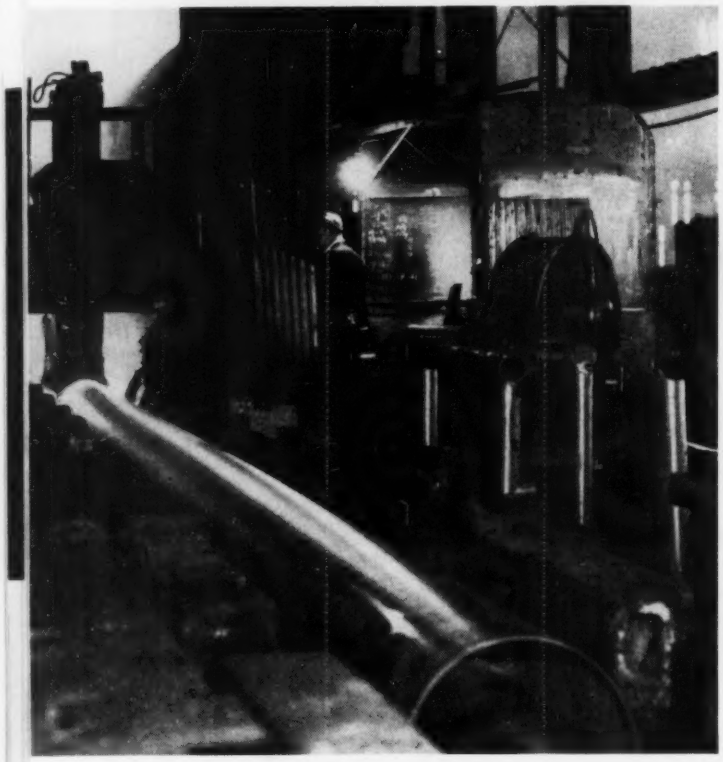


Fig. 7—Reeling operation which smoothes out irregularities and burnishes surfaces of the shell both inside and out

ments and by a hydraulic wedge for larger vertical movements. Stripper rolls are provided with grooves, the top roll being set slightly above the pass line while the lower one is carried on a segment enabling it to be raised to strip the shell back to the entry side of the mill upon completion of the rolling pass and lowered far enough to permit free travel of the shell during rolling operations. Usual procedure is to groove the main rolls with about 100 degrees of each groove concentric with the pass and plug center, with the remainder of the groove being slightly flared. A pusher air-cylinder rams the billet into the pass where the rolls compress the shell against the plug, reducing the wall on about 70 per cent of the circumference and carrying it on and over the plug.

Fig. 8—View of 24-inch OD seamless pipe emerging from reeler



The plug is then removed, upper main roll elevated by means of the hydraulic wedge and stripper rolls brought into engagement with the shell, returning it to the mill's entry side. The shell is then rotated 90 degrees and returned to the mill to be given a second pass over the plug. Usually two passes suffice to reduce the wall and elongate the shell but occasionally a third pass is given when the first two fail to elongate sufficiently.

In the interest of economy, it is customary to provide both main and stripper rolls with several grooves, sometimes of different diameters, to permit rolling other sizes without the necessity of changing rolls.

Obviously, it is important to have accurate alignment of roll grooves and to use only plugs having a true circular section as otherwise the roll groove and plug cannot be concentric with each other and nonuniformity of shell wall will result.

Operations to this stage have produced a shell having approximately the desired average wall thickness and length but further processing is necessary to effect required smoothness and dimensional tolerances. Fig. 6 shows a shell being plug rolled.

Following plug rolling, except for the large diameter products which will be discussed later, the shell proceeds without reheating to one of two reelers. These, arranged in parallel, are required to keep pace with the faster preceding operations because of a low delivery rate out of the reelers which, for proper reeling, is due to low feed angles employed. Function of the reelers, which structurally are similar to the piercing mills, (see No. 14 of the diagram and Fig. 7) is to smooth out surface irregularities and burnish surface of the shell both inside and out. Rolls and plug are almost true cylinders presenting long surfaces parallel to the shell wall being reeled. The shell is slightly expanded and shortened in the reeling operation. Fig. 8 shows a 24-inch outside diameter pipe emerging from a reeler. Although it is not standard practice to provide any reheating just ahead of the reeling operation, such reheating would result in a better product, especially for thin wall pipe.

For pipe having a diameter of 16 inches or greater, there is interposed between the plug mill and reelers a second reheating furnace and an expanding mill. The reheating furnace may be similar, except for size, to that described for reheating ahead of the plug mill. The expanding or rotary mill, illustrated by No. 13 of the diagram, functions much like the piercing mills. Because of the larger diameter, greater expansion required and much thinner walls generally produced, this mill must be classed as a precision unit.

(*To be continued*)

Heat Transfer Book Published

DEVOTED mainly to the fundamentals of heat transfer, is the first of two volumes offered by Dr. Max Jakob, research professor of mechanical engineering, Illinois Institute of Technology. Entitled *Heat Transfer,* it is a treatise for research workers and a textbook for graduate and intermediate teaching. It is being published by John Wiley & Sons, New York.

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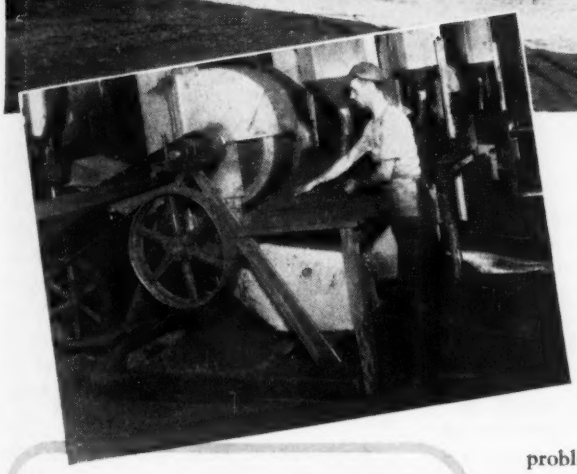

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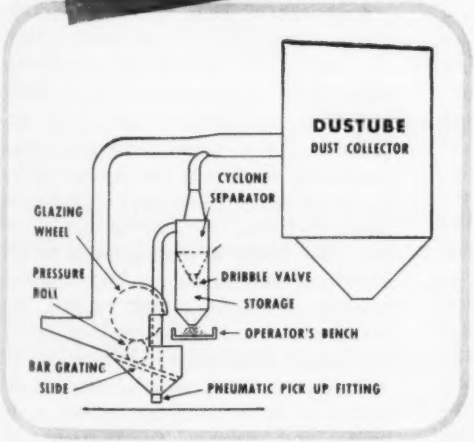

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DESPITE strike-bound iron and steel plants the annual convention of the Association of Iron and Steel Engineers, William Penn hotel, Pittsburgh, Oct. 3-6, closed with an attendance just slightly above that of two years ago which was a no-show the same as this year. A report of the business session, including the new officers of the association, Kelly award recipients, next year's meeting location and other details, was presented in STEEL, Oct 10, page 90.

A digest of some of the papers delivered at this year's meeting follows:

In his paper, "Construction and Maintenance of Open-Hearth Furnace Bottoms", C. W. Conn, Steel Division, Ford Motor Co., Detroit, mentioned that a good percentage of bottom and bank trouble is created by the human element. While there is room for improvement in the chemical composition and physical characteristics of basic open-hearth bank and bottom construction and repair refractories, we have not gained all of possible efficiency from present units.

If all first helpers today had on-the-job and classroom training as concerns furnace construction, composition and use of refractory materials, chemistry and metallurgy of steelmaking, fuel and alloying elements, we could be assured by all reasonable means that we had qualified men to run our furnaces.

Another Art—Steelmaking is an art in every sense and we should stop treating the training of personnel in such a hit or miss fashion. First helpers who had served their apprenticeship and were graduated journeymen, again could travel from shop to shop as of old, adding to their experience and knowledge. It would minimize, if not eliminate, many problems existing in our industry with labor, provide a sound basis for training and evaluating our personnel, accomplish more tons per hour, less fuel per ton, and greatly decrease bottom and bank trouble.

R. Tietig, Jr., A. J. Boynton & Co., Chicago, in his paper entitled "Increased Open-Hearth Production by Improved Charging Methods", states that to many observers the conventional method of charging open-hearth furnaces is not an efficient operation. In most instances, the defects are easily recognized. For example, the simultaneous charging of scrap in adjacent furnaces frequently results in charging delays or a greater number of furnaces may require hot metal at any one time than there are cranes available for its delivery.

Too Many Problems—Solution of these and other problems would require an entirely new arrangement of an open-hearth plant which in turn may present other undesirable conditions of ever greater magnitude than those currently existing. An idea of this may be found in the frequent suggestion that a furnace equipped with a removable roof or front wall could be charged in a single operation without interfering with an adjacent furnace. It should be noted, however, that such a method of charging applied to heats being made by the flush slag practice would probably result in an extremely long heat time because of the difficulty of heating the ore and lime stone in the bottom of the charge.

Much of the hot blast stove development has come about with the use of better cleaned blast furnace gas and improved stove efficiency. This fact was brought out in a paper on "Checker Brick Design, Construction, and Use" by J. J. Seaver, J. J. Seaver Engineers, Chicago. Old stoves used from 35 to 50 per cent of the gas produced to heat the checkers to give an air temperature of 1000 to 1100° F, with a chimney temperature ranging from 700 to 800° F. The same size stoves, the speaker pointed out, with improved checkers and increased wind volume, are able to carry 1600° F straight-line heat with a 350° chimney temperature on a consumption of only 20 per cent of the gas produced; or stove efficiencies ranging from 80 to 90 per cent are possible with present day designs.

One Shape—Speaker believes that checker brick for each set of regenerators should be limited to one shape. This will reduce manufacturing and laying costs, and inventory storage space. He warned that checker brick should not be oversize inasmuch as an accumulation in size of each brick not only gets the checkers out of alignment but causes extensive cutting at the walls.

Recent tests, made on checker brick approximating open-hearth heating and reversal conditions, show that the outer ½-inch of the vertical surface of the brick absorbs 2/3 of the heat taken up or given off by a checker brick, and that the first 1-inch absorbs 90 per cent of the total heat exchanged.

Tests show that the open-hearth brick walls should not be thicker than 2½ inches to meet all requirements, especially if they are locked in place.

That maintenance is of prime importance to a smooth-running, top-producing steel mill was advanced by S. D. Baumer, manager, Technical Sales Division, Air Reduction Sales Co., New York, in his paper on "Steel Plant Maintenance". The author pointed out that many repairs are centered around either welded applications or weld-deposited new metal.

It is in such operations that availability of the correct equipment, electrodes and supplies, the correct personnel and the functioning of top-notch supervision becomes of greatest importance. Supervisors must have reliability, capable operators to carry out the work according to specifications for each different job; operators must have the necessary equipment and supplies. With it, results, costs, and efficiency will all be highly gratifying.

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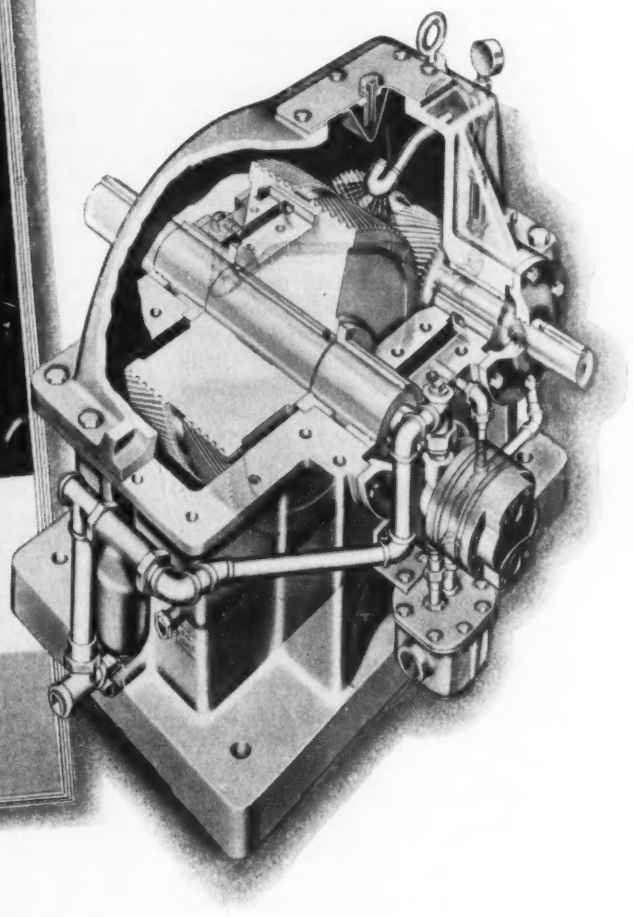

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Mr. Baumer pointed out that the same principles underlie the success of all phases of steel mill maintenance. Fundamentally, he said, they can be summed up as the application of production thinking and production standards to maintenance work.

The next few years, the author believes, will see the introduction of still more new techniques and facilities, still further improvements in methods, and steadily increasing know-how among maintenance men.

Yield is increased by conveyor systems capable of handling large tonnages of heavy coils dependably, yet gently enough to reduce damage and scrap losses to a minimum. This was brought out in a paper entitled "Developments in Coil Conveyor Equipment Design" by L. O. Millard, Link Belt Co.

Widespread Savings — Chain conveyors are effecting economies in various processes, from the hot mill to the shipping platform, in the author's opinion.

The car-type conveyor is an ideal unit for cooling hot coils on end, for its beam tops combine broad bearing surfaces with ample space between for circulation of air. The coil remains on its own car from loading to unloading zones, without transfer regardless of path of travel, thus reducing the possibility of coil damage to a minimum.

While coil conveyors improve efficiency in performing their primary functions of economical and safe transportation, they offer additional returns in the form of increased yield, by handling coils with less damage than other methods.

The most important advance in transfer design would be a conveyor system which eliminated all transfers. The car type accomplishes this objective within the limits of its own travel. Another step in this direction was made by the application of the booster drive to coil conveyors.

The author also mentioned that drive units have been further improved by the use of fluid couplings to cushion mechanical parts against shock loads, to limit overload stresses, and to eliminate the necessity for high starting current.

In the paper "Controlled Cooling of Steel Blooms in Car Bottom Furnaces" by S. J. F. Burch, supervisor design, open hearth and electric furnaces, Carnegie-Illinois Steel Corp., Duquesne, Pa., it was brought out that slow cooling is the common flake prevention treatment. The speaker stated that if some types of high-carbon or alloy steel blooms or billets are permitted to air cool to atmospheric temperature after they are rolled, fine cracks, generally described as flaking, will develop throughout the center portion of the piece which may render the steel unfit for its intended use. He advocated a heat treatment involving slow cooling of the hot-rolled product to control flaking.

Cooling Time—This may take 8 to 12 days depending upon the size of the bloom. This is a time consuming feature and is a matter of much dissatisfaction from a production and delivery standpoint. On the other hand, the use of fired pits or furnaces for the cooling process presents a positive solution to the flaking problem and is referred to as "controlled cooling". It is a cycle treatment and produces the most desirable structure for further processing. Uniform quality of the product eliminates excessive testing and hence, permits early scheduling of the secondary mills, thus reducing delays. Conditioning time and costs are reduced and chipping is possible where grinding would frequently be necessary. Reduction in cooling time by as much as 75 per cent expedites delivery of the finished product.

In speaking of the car bottom furnace, the author pointed out that the initial cost of this type furnace is estimated to be 25 to 30 per cent higher than the bell-type furnace and approximately 15 per cent higher than the pit type furnace. He explained, however, that the maintenance of the car bottom furnace is estimated to be about ¼ that required for the bell type and pit furnaces.

Advantages and disadvantages between the straight-away continuous mill as compared with a 14-inch semicontinuous cross-country mill were presented by L. C. Sowell, superintendent of blooming and rolling mills, Aliquippa Works, Jones & Laughlin Steel Corp., in his paper on "Continuous Merchant Mills." With the cross-country mill a check of sections can be made more easily between stands, whereas in the straight-away continuous mill it is necessary to throw out cobbles which is costly in time and material. The cross-country mill also has a distinct advantage in that temperature and finishing conditions can be more readily controlled.

As to the rolling rate and the overall cost, the author believes with bottlenecks eliminated that the straight-away continuous mill will have a distinct advantage. Once this type mill is set up on a section, it becomes a matter of close attention and watching of bar travel and checking of section; the remainder is merely routine. He also mentioned that theoretically the continuous mill is subject to more cobbles and a slight increase in steel loss over the cross-country mill. Actually, he explained, it requires a straighter and truer delivery from span to span. Maintenance and utility costs, which are vital to all operating units, appear to be about equal.

W. W. Scherer, division superintendent of maintenance, Carnegie-Illinois Steel Corp., Homestead Works, Pittsburgh, in his paper entitled, "The Problems of Mill Building and Equipment Painting", states that undoubtedly the most important single consideration is the continued maintenance of adequate surface protection of mill building and other exposed structures.

Rapid Corrosion—The proximity to gaseous products of combustion, at normal temperatures and a variety of other influences, leads to an accelerated rate of corrosion. Degree to which such influences may affect the life of the metal coating, for example, is well illustrated by an authoritative estimate of the life of a galvanized coating of 2 ounces per square foot of various atmospheres. It is estimated that such a coating will last approximately 150 years in certain dry tropical locations, 25 years in rural England, 5 years in urban England, and one year in an English railway tunnel.

Influences to which paint films are exposed frequently vary from time to time and may not be well defined; consequently, laboratory tests have a limited value in determining the most effective methods and materials.

At an average steel plant about 40 per cent of all labor on the payroll is involved directly or indirectly in the handling of materials. This fact was brought out by L. R. Astie, Jones & Laughlin Steel Corp., Pittsburgh, in speaking on "Materials Handling in Steel Plants". He pointed out that about 1/3 of the total cost of production in the steel plant is involved in materials handling. Safety authorities find that about 70 per cent of all personal injuries in a steel plant are due to some phase of materials handling.

Radical Changes Not Needed—By simple mechanization, materials handling operations have been simplified, the flow of material has been increased in volume, production made more uniform, worker fatigue minimized, personal injuries materially reduced, productivity per manhour increased and production costs generally reduced or kept in line in the face of increasing prices.

With increasing complexities of operating conditions, it has become necessary that we have specialized help to direct our thinking and assist in

finding answers for the endless number of problems that arise in every phase of our plant operations.

C. T. Lewis, Republic Steel Corp., in his paper on "Bearing Inspection and Repair" pointed out that the first basic requirement for bearing inspection and repair is the proper area and the necessary facilities for handling the bearing parts through the steps of inspection and repair. The second requirement is that the area should be in connection with or adjacent to the necessary machine shop services that may be required to carry out machine work in connection with the needed repairs. He recommended that the facilities in the bearing shop should include a surface table, a cleaning tank or degreaser, a crane or hoisting equipment, tools including grinders and buffers, and provision for parts storage.

He stressed the importance of a definite service period for given bearings as being the interval between each inspection. If the inspections are made too close together, the cost may overshadow the savings gained and if the periods are of too long a time the bearings may be too far gone to make satisfactory repairs.

By moving the load zone of the cups of the bearing through 90° rotation at each inspection, the time of complete failure can be pushed further into the future. If the bearing is turned end for end at the completion of each 360° rotation, the life of the bearing can again be prolonged to some extent.

E. W. Fisher, Garlock Packing Co., Palmyra, N. Y., in his paper entitled "Considerations in the Development of Rolled Neck Oil Seals", states that advances in the production of high-speed mills, have brought new power, lubrication, bearing and sealing problems. Functioning of the seals largely governs the life of the oil and the amount of makeup necessary. For the past 15 years more and more attention has been directed toward the improvement of this oil seal.

Synthetic Rubber — Improvement came with synthetic rubber of the corrugated type commonly known as neoprene. Direct saturation was worse than in the original for the new material was softer and cross section for cross section more flexible resulting in overheating, burning and more leakage. Next was the buna-N type synthetic. Here was an improvement over the corrugated type. It has no affinity for steel so did not require such treatment of the cloth facing which only wicked the oil past the lip. Nor did it decompose at high temperatures to yield corrosive by-products. But unfortunately it did become hard and almost as fast as the corrugated type. Good bearings do not wear out very fast. Oil seals functioning reasonably well do not wear out fast. This was a good and true statement of fact then and also today.

From considerations presented, there has developed the thought that flexible seals making spring loaded contact normal to a cylinderical shaft, presents the most satisfactory answer for roll neck seals.

J. A. Toth, Torrington Co., Bantam Bearings Division, South Bend, Ind., in his paper entitled "Relationship of Preventative Maintenance and Roller Bearing Application", states that it is possible to develop bearings of types and sizes to meet any condition of load, but in most cases, the limiting factor is introduced by the initial cost and the massiveness of the equipment.

Experience has definitely proved that oil lubrication will prevent excessive neck wear and scoring. Consideration should be given to use of lubricants with low viscosity to allow flow to bearing bore, but at the same time, it is necessary to establish the lubricant viscosity to prevent leakage through the seals. Seasonable temperature variations introduce a requirement for change of viscosity of lubricant and this is more or less standard mill practice at the present time. A direct relationship can be established between service life results secured with bearings in slow speed stands and bearings in higher speed stands near the end of the finishing train. A similar relationship can be established for load conditions in different stands. For each stand on cold and hot mills, it has been suggested that a factor be applied that would encompass speed, load and time underload.

Lubrication Program — A lubrication program might be considered to include personnel familiar with the equipment and also a lubrication engineer representing the lubricant supplier. Lubricant manufacturers have developed charts covering the specifications for lubricants used in the automobile; consequently, there should be no objection to developing similar charts for equipment in the steel mill plant. Such a program may reduce the number of types of lubricants needed for central storage and control.

E. W. Head, sales manager, Control Corp., Minneapolis, in his paper entitled "Supervisory Control and Telemetering As Cost Reduction Tools", stated that most electric utilities have active systems of supervisory control and telemetering in service, or are laying plans to adopt these in their operation. True economic advantages result from the use of this type equipment, such as lower operating costs and improved operating efficiency. Such equipment will allow one operator at a central point, to control, supervise and meter equipment in processes, at one or more remote points. Savings that result in this case are in the form of wages of operators that would normally be used to man the remote points and these savings over a year or two will usually buy enough supervisory control and telemeter equipment to allow these operators to be eliminated.

As supervisory control and telemetering are cost production tools, it can be used to control any remote equipment that is subject to control by closing an electrical contact. While supervisory control and telemetering do not constitute a cure all for all high-cost operations, they do have a definite place in the field of cost reduction.

H. E. Larson, Steel Mill Division, Industrial Engineering Division, and T. Dunnegan, Jr., Control Systems Division, General Engineering and Consulting Laboratory, General Electri Co., Schenectady, N. Y., in their paper entitled "A Static Magnetic Amplifier for Regulating Circuits" and known as an "amplistat" pointed out that when the device is properly applied and integrated into a regulating system, it becomes the motivating factor that monitors the entire regulating system. It does so by sensing small signals, amplifying them greatly and quickly imparting the amplified commands to the system with decisiveness and stability so that the system can properly adjust itself to the desired standard.

This device requires no periodic maintenance because it is a static device with no moving parts or electronic tubes. The amplistat is not expected to revolutionize the iron and steel industry, but it will prove useful in many applications.

B. A. Rose, director of engineering, Heyl & Patterson Inc., Pittsburgh, in his paper on "Recent Developments in the Design of Coal and Ore Bridges" presented data to show that the simple 2-motored hoist with totally enclosed gears should have preference in any bridge application. A new design of turn table has been devised so that the advantages of this hoist can be retained in those applications where the bucket must be rotated in its operation. The speaker recommended simplication of the cumbersome spring suspension and cradle-type trolley drive. The proposal is to use a frame mounted motor with a totally enclosed axle hung gear

case and a rubber mounted axle suspension scheme.

Variable voltage control scheme, he stated, has definite advantages which make its use justified on new bridge installations. Use of welding provides a structure which is more readily cleaned and protected from corrosion.

Otto Jensen, manager Rectifier Division, I-T-E Circuit Breaker Co., Philadelphia, in his paper entitled "The Mechanical Rectifier" states that advantages of this device include its inherent high efficient in its voltage range, small space requirement, and low installation cost, due to completely factory-wired units. The major item requiring replacement is the contacts which have an expectant contact life of 18 months and which can be replaced in 10 minutes for a 5000 hp machine. Life of mechanism bearings is better than 50,000 hours and a complete reset of bearings can be installed in 12 hours at a cost of less than $100.

Limitations of the mechanical rectifier are its relative low-power factor (86-90 per cent) and tendency to backfire by overloading beyond its guaranteed overload capacity and by interruption or loss of 60 per cent of ac voltage. In both cases, the contact mechanism is protected against severe damage by short-circulating both the ac and dc sides of the mechanism by a ultra-high speed (0.001-second) device which operates whenever the ac input does not balance the dc input. After the short-circuiting device operates, the dc brake is switched due to reverse current and the ac brake is switched due to overload. Short circuit stresses on the ac side are moderate because the commutating reactors are left in the circuit. They still produce the step and the short-circuit current is therefore only approximately half of the value it would assume if the reactors were not in the circuit. Due to the step, the interrupting duty of the ac breaker is materially reduced. Net damage to the mechansim whenever a backfire occurs, is that one or at most two contacts are burned and they should be replaced at the first opportune time.

Records 1 Hour Continuously

EXECUTIVE meetings, conversations and instructions may be recorded on the sound reel magnetic tape recorder introduced by Mark Simpson Mfg. Co. of Long Island City, N. Y. One hour of continuous recording may be made on the 1200-foot reel of tape which may be used up to 5000 times. Same recording may be played back many times.

LETTERS *to the Editors...*

Concerning Four-Wheel Drive

Mostly, personally, I take STEEL for the excellent page, "Mirrors of Motordom", by A. H. Allen. I have noted the news article on four-wheel drive passenger cars on page 46 of the August 22nd issue of STEEL, and let me state the following as a matter of information and, I believe, true fact:

Reference your article says, "First production-line passenger car with four-wheel drive is now being built by Willys-Overland Motors, Toledo, O." The fact of the matter is that the first four-wheel drive passenger cars that were built and in quantities were made by Marmon-Herrington of Indianapolis, Ind. Marmon-Herrington built their own axles, engineered and manufactured these for wide distribution. Much of their bus work has been export. Many of them were used for war purposes even before World War II. We know because we built "tropical" radiators for them to take up to 130° temperature for desert transportation but these were not special, they were standard products which Marmon-Herrington made. I thought this might be of interest to you.

You might tell me these are conversions of Ford cars, but close relationship between Ford Motor and Marmon-Herrington has always been available, much as other companies use axle grouping or assemblies here and there.

F. M. Young, President
Young Radiator Co.
Racine, Wisc.

Society's Address

We note in your August 15 issue a paragraph mentioning that the National Society for Prevention of Blindness had published a manual of toxic eye hazards. Can you give us the society's mailing address?

R. W. Schlumpf, Chief Metallurgist
Hughes Tool Co.
Houston, Tex.

Society address is 1790 Broadway, New York 19, N. Y.—The Editors

Our Author Corrected

We wish to call your attention to an article in the August 8 issue of STEEL, "What's Left of Japan's Iron and Steel Industry?", credited to Mr. J. Z. Reday, president, International Engineers Inc., New York.

This article begins on p. 68 and includes a box reading as follows: "For nearly 3 years, Mr. Reday served as chief of the Industrial Division of General MacArthur's Staff. Since June, 1948, he has been engaged in trading and engineering work in Japan, and holds the only postwar consulting engineering license in that country."

This statement is entirely inaccurate. A check of license records maintained in General Headquarters discloses a total of nine such licenses issued. This total includes our own license.

We have on our staff highly qualified and thoroughly experienced American licensed (professional) metallurgical, chemical, electrical and mechanical engineers. We are active in the metallurgical field and have so advertised both locally and internationally.

Porter D. Dilley,
Manager, Japan Branch
Traders Service Co. Inc.
Tokyo, Japan

Statement referred is not "entirely inaccurate". In light of evidence, Mr. Dilley is entirely justified in questioning that portion concerning the postwar license. We are happy to stand corrected.—The Editors

Being Forwarded

We would appreciate your sending us extra copies of the article on "Cold Shaping Steel" which appeared in the issue beginning July 25, 1949.

M. N. Holmes
Purchasing Agent
North & Judd Mfg. Co.
New Britain, Conn.

Article referred to appeared as two parts in the July 25 and August 1 issues.—The Editors

Comparing Steel Production

The writer had occasion to listen to a talk by a college professor who stated that the European countries including Germany had made such a comeback that they were now producing more steel than before the war. This sounded a little farfetched so we would ask if you happen to have any reliable data on the subject.

L. E. Collins, President
Medina Stamping & Machine Co. Inc.
Medina, N. Y.

According to figures published in STEEL Yearbook issues (Jan. 3, 1938, p.290 and Jan. 3, 1949, p.298), the production of steel ingots and castings was, in 1937, 68,657,000 net tons, and in 1947, 57,032,000 net tons. These figures include tonnages for Great Britain (10,615,000 and 14,246,000 net tons, respectively) and for Russia (15,164,000 and 16,800,000 net tons, respectively). These figures would make the professor wrong. However, if he used 1934 figures, for instance, steel ingot and casting production was 43,252,000 net tons, this including 7,894,000 net tons for Great Britain and 8,396,000 for Russia. All countries in continental Europe are included.—The Editors

New Products and Equipment

Self-Timed Stud Welder

Principle of the single gun stud welder made by Graham Mfg. Corp., 1541 E. Eight Mile Rd., Ferndale 20, Mich., is a capacitor-operated, self-timed device using tip studs which, on coming in contact with the work and fusing, causes ionization. This

in turn allows a path for the main discharge current of the capacitor to form an arc sufficient to melt both the full diameter of the stud end and the work piece directly under it. Following this is the hammer blow causing the pieces to weld. Time of the arc is about 1 mil second, which makes possible use of very high currents.

Advantages from short arc time include concentration of heat, welding of studs on very thin metal, no distortion of work or discernible heat, and possible welding of dissimilar metals. Stud dimensions may be up to ½-inch and welding pressure may be either mechanical or pneumatic. Overall cabinet dimensions are 16 x 24 x 38½ inches.

Check No. 1 on Reply Card for more Details

Dip Tank Is Automatic

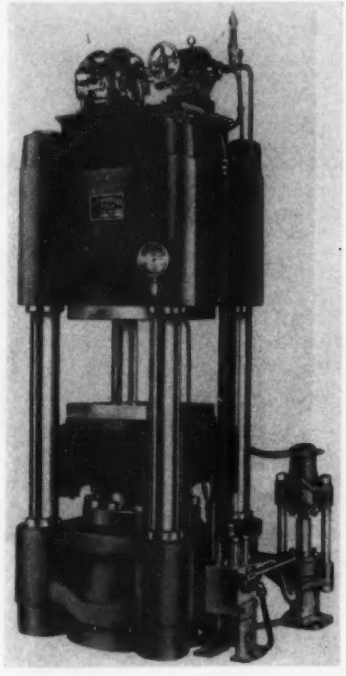
Manual labor is eliminated in the operation of the Dip-O-Matic dip tank for cleaning of metal parts, designed by Hopkins Equipment Co., 40 Maple Ave., Hatfield, Pa. A three-way finger-tip control air valve automatically lowers and raises specially designed basket into the cleaning solution. Floor space required is 2 x 3 feet.

Metal cleaning action is twofold: Soaking action helps loosen dirt and grease and agitated solution action washes parts. Steam heat maintains cleaning solvent at proper temperature, or cold solutions may be used.

Check No. 2 on Reply Card for more Details

Hobbing Press Has Two Ranges

Accurate hobbing of intricate single and multicavity molds may be accurately carried out with the 1000-ton upmoving HydroLectric press developed by R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa. The hydraulic press offers a platen work-



ing surface measuring 24 by 30 inches, made of ribbed box section cast steel.

Working pressure of 3000 psi is supplied to the ram by a rotary piston-type pump with a 4½ gallons per minute displacement at this pressure. By use of a hydraulic intensifier, a high pressure of 6350 psi can be achieved. Press is controlled through a lever-operated 4-way operating valve. Protective devices, hydraulic pressure gage, wiring and all necessary valves and control equipment are supplied with the unit.

Check No. 3 on Reply Card for more Details

Smoke Detector Protection

Four spaces may be protected simultaneously by a smoke detector developed by Walter Kidde & Co., 40 E. 34th St., New York 16, N. Y. Two main units of the detector are the control cabinet and analyzer tube. In each protected area, one or more accumulators are installed at the ceiling, connected by rigid piping to control cabinet.

Analyzer tube, mounted near the control cabinet, is connected to it electrically and by piping. All accumulators in all spaces are under constant suction, drawing continuous streams of sampling air to the control cabinet. Air from each space is sampled for 10 seconds in succession. If 3 per cent or more smoke is present in any air sample, the valving mechanism stops and the fire alarm rings. A numbered wheel indicates the space from which the alarm originates.

Check No. 4 on Reply Card for more Details

Switch Directs Conveyor Flow

Flow of material from one single conveyor line to two lines, parellel or converging, at 45 degree angles either right or left is possible with the Y switch offered by Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y. Center section is locked in posi-

tion. Switch is available with wheels or rollers. A 90 degree turn, right or left, may be accomplished with the addition of 45 degree curves. Both wheel and roller types are available for use with 12, 14, 18 and 24-inch conveyors.

Check No. 5 on Reply Card for more Details

Table Lifts 750 Pound Loads

Montgomery & Co. Inc., 53 Park Place, New York 7, N. Y., is offering a hydraulic elevating table which enables one man to carry or lift 750 pounds. Constructed of steel, the table is portable, but can remain fixed in any position. The hydraulic jack which raises it ¼-inch per stroke can be removed.

Use can be for transferring of dies, moving of heavy work from horizontal mills to drill presses or for supporting and leveling large over-

hanging pieces of work. Maximum and minimum floor to table heights are 42 and 27 inches, respectively. Top of the table measures 19 x 28 inches.

Check No. 6 on Reply Card for more Details

Cuts Washing, Pickling Time

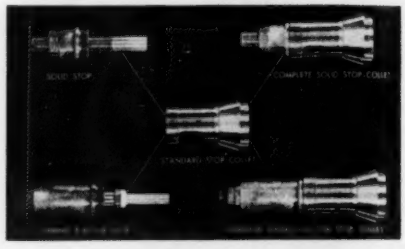
Pickling time is cut to less than one-third in a completely enclosed washing and pickling machine developed by R. C. Mahon Co., Detroit, Mich. A Hydro-Hermetic seal incorporated in the spray pickling equipment protects the continuous overhead monorail conveyor and prevents the escape of spray or fumes. Used for the preparation of metal surfaces to receive porcelain enamel, the process is continuous through all operations: Emulsion cleaning, clear water rinse, alkali cleaning, three-stage water rinse, sulphuric acid bath, acid water rinse, nickel sulphate bath, sodium cyanide neutralizer, borax neutralizer rinse and hot air dry-off.

Tanks and tunnel housing are of mild steel except in areas where corrosive materials are in contact or fumes prevalent. Here steel is lined with lead, rubber or Monel metal. The seal also prevents loss of active chemical fumes, reduces ventilating requirements to a minimum and eliminates the necessity for replacement of air within the building. Pickling machines are designed to meet any requirement of product processing, production rate, or plant layout.

Check No. 7 on Reply Card for more Details

Stop Collets and Stops

Available from stock are stop collets and stops for Brown & Sharpe automatics and wire feed machines, made by Hardinge Brothers Inc., Elmira, N. Y. With the standardized unit, the operator or setup man can

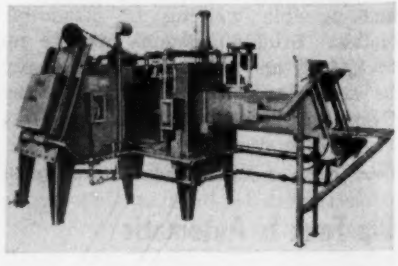


easily apply either a solid stop and spring dejector stop to a standard stop collet. They are treated for direct application of either the spring ejector or solid stop. A variety of types and sizes are available.

Check No. 8 on Reply Card for more Details

Finish for Bright Annealing

Molybdenum, 18-4-1, 18-4-2 or cobalt type high speed steels can be hardened virtually bright and free from decarburization or carburization in the L-type atmosphere hardening furnace developed by Lindberg Engineering Co., 2444 West Hubbard St., Chicago 12, Ill. Unit consists of



preheat, high heat and quench, all built into one complete unit. Preheat is built at a right angle to the high heat and the quench unit follows.

Quench unit is designed to quench steel by means of forced convection, cooled, protective atmosphere. Sections of high speed steel up to 2 inches can be fully hardened by the atmosphere quench. The protective atmosphere used is generated in a separate atmosphere generator. Either the Lindberg Hyen endothermic atmosphere generated from city, natur-

FIVE YEARS SERVICE WITH MINIMUM REPAIRS TO WALLS AND ARCHES!
FOR ECONOMICAL SOAKING PIT INSTALLATION SPECIFY BUCKEYE!
● Buckeye Silica Firestone holds heat longer—provides greater savings in fuel! It has greater than usual strength to resist abrasion—saves repair costs! Its corrosive resistance guards against chemical attacks of slag—makes it last longer!
Other important features make Buckeye Silica Firestone ideal for the solution of your soaking pit problems. Write us for full information.
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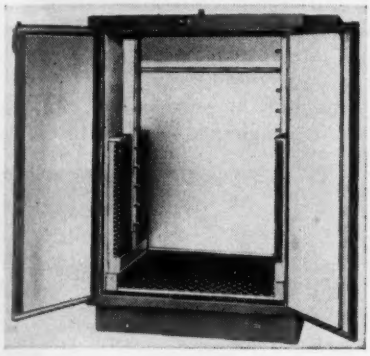
1740 E. 12th St., Cleveland 14, Ohio
Bulletin 15-B is free. Send for it!
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

al, propane, or butane gases or the Hyco atmosphere generated from charcoal can be used.

Check No. 9 on Reply Card for more Details

Oven Controls Temperatures

Developed to provide the accurately controlled temperatures necessary for preheating and curing of plating rack coatings is the electric oven offered by Belke Mfg. Co., 947 N. Cicero Ave., Chicago 51, Ill. Ovens also provide controlled heating for other uses in various types of plants



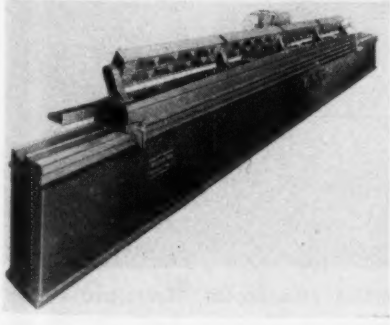
and laboratories. Temperature is maintained at any preset temperature between 300 and 400° F by automatic control. Other ranges can be furnished.

Ovens are insulated with 3 inches of glass wool. Nichrome 5 heating elements are easily replaceable, being mounted on the bottom and side walls for uniform heating. Construction is of sheet metal and angle iron. Units are wired and ready for connection to most electrical service outlets. Ovens are available in three standard sizes or made to specification.

Check No. 10 on Reply Card for more Details

Grinder Handles 220-Inch Knife

Measuring 28 feet in length, a heavy-duty straight knife grinder, produced by S. C. Rogers & Co., 191 Dutton Ave., Buffalo 11, N. Y., ac-



curately handles any heavy chipper knife, shear blade, paper cutting knife and doctor blade up to 220 inches in length. A 15 hp motor handles the 20-inch segmental grind-

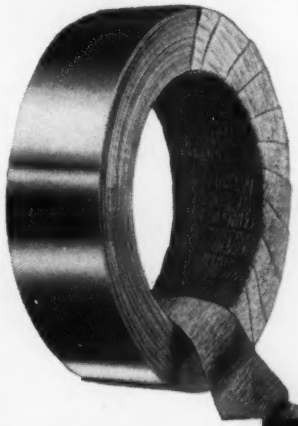
"Duck, Plunkett... OVERHEAD!"

Oops! Sorry! You can't duck overhead any more than you can evade taxes. But you can *do something about lifting it a bit . . . to give you headroom. And here's how!*

★ ★ ★

It's done by cutting away dead wood—unprofitable process steps that can be eliminated, unproductive floor space that can be turned into a revenue producer, and personnel that can be shifted from non-profit operations. Accomplish all three and your overhead will lift automatically, letting welcome profit sunshine in.

Easier said than done? . . . Not if you know about *pre-coated* Thomas Strip—one of the most effective overhead-lifters that ever happened. *Pre-coated* in copper, brass, nickel, chrome, zinc, tin or lacquer, it makes possible the streamlining of your process to its two profitable essentials—fabrication and assembly. Preparation, cleaning and buffing, and plating . . . all three bothersome steps can be eliminated. And in addition, *pre-coated* Thomas Strip fabricates easily and with uniformly high quality.



Discover the overhead-reducing power of *pre-coated* Thomas Strip for *yourself*—in your own shop and process. We will be glad to study your requirements and suggest the analysis of Thomas Strip best suited to your product and process. A trial run will carry its own convincing proof. Write today or call:

THE THOMAS STEEL COMPANY
WARREN, OHIO
Specialists in Cold Rolled Strip Steel

COLD ROLLED STRIP STEEL

Electrocoated with Chromium, Nickel, Copper, Zinc and Brass • Hot Dipped Tin and Lead Alloy • Lacquer Coated in Colors • Annealed and Tempered Spring Steel • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications.

Thomas Strip

SPEEDS PRODUCTION... CUTS COSTS

ing wheel and a 3 hp motor guides the traverse carriage.

Five-inch V-ways in base and carriage absorb grinding pressures and permit heavy cuts and fast feeds. A jaw clutch transmission starts the table smoothly and moves it steadily. The model 220 machine is also available in 100, 110, 134 and 238-inch lengths.

Check No. 11 on Reply Card for more Details

Resistance Welder Slope Control

Designed to provide a refinement of a gradual increase in welding current at the beginning of the weld, a new slope control for use as an accessory with either synchronous or nonsynchronous resistance welding machines as offered by General Electric Co., Schenectady 5, N. Y. It materially reduces tip pickup in spot welding aluminum, magnesium and their various alloys.

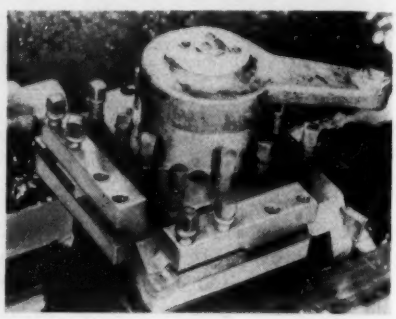
Accessory control is furnished in two types: For mounting in the side of synchronous controls; the other in a separate enclosure for use with older types of controlled nonsynchronous control. Setting of one of two dials, which is graduated from 3 to 13 cycles, determines the time for the welding current to reach a final value from its initially low value. Other dial permits adjustment of the initial value of the welding current. A transfer switch disconnects the slope control for those operations for which it is not needed.

Check No. 12 on Reply Card for more Details

Tool Holder Cuts Setup Time

A tool holder which allows standardization on one size tool and which cuts setup time, thereby speeding up production, is offered by Rusnok Tool Works, 4840 W. North Ave., Chicago 39, Ill. Holder will allow turning of two diameters or facing two shoulders with one pass. Large cuts may be made with small tools.

Made of hardened steel, its construction makes it possible to use ½-

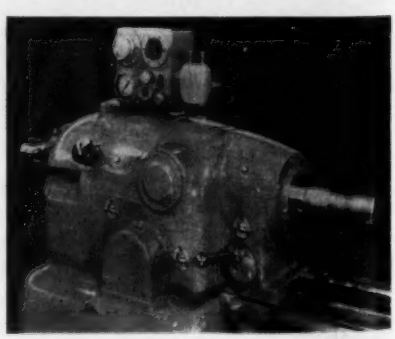


inch tools on jobs that would normally require larger tools. After the correct height is obtained with the tool holder by the use of the rocker arm of the tool post, the tool can be removed from the holder for grinding and replaced without disturbing the setup. A tool can be used from either end of the holder.

Check No. 13 on Reply Card for more Details

Lathe Collet Speeds Output

Output of the 10-inch precision manufacturing lathe and the Speedi-Matic hand-operated screw machine may be increased by an air-operated



collet attachment, developed by the Monarch Machine Tool Co., Sidney, O. Design permits use of a bar feed attachment. Two pushbuttons in the headstock of the machine control the attachment, one opening and the other closing.

The Vice-President says:
"If it's an
R.D. Wood
...it's good"
As a company executive, I must see that our plant equipment shows a measurable investment profit. We depend on R.D. Wood hydraulic presses. We know the quality that's built into them.

Write for information and data sheets on hydraulic presses, or consult us without obligation on *any* hydraulic problem.

HYDRAULIC PRESSES AND VALVES FOR ... INTENSIFIERS

EST. 1803

R.D. Wood Company

Lifeline for Western Industry

Western steel—and the hundreds of industries it supports—needs a close-up supply of iron ore.

To assure the West a stable steel source, Kaiser Steel developed its own rich iron ore deposit at Eagle Mountain, California . . . which supplies Fontana's blast furnaces with 3,000 tons a day by way of one of the nation's shortest iron hauls. There is enough ore in this deposit to last for more than 60 years.

More evidence of the unsurpassed resources of the West's only integrated *independent* steel plant . . . which is bringing more industry, more jobs, more wealth to the West!

It's good business to do business with

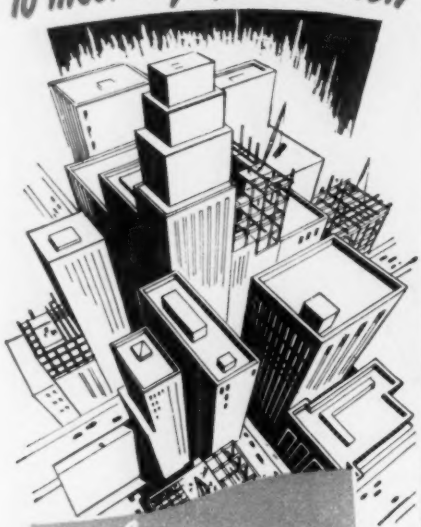
Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip hot rolled sheet • alloy bars • carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels pig iron • coke oven by-products • For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE**

STRUCTURAL STEEL FABRICATION

to meet any specification



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TIPPLES

The LEVINSON STEEL COMPANY

32 PRIDE ST. • PITTSBURGH, PA.

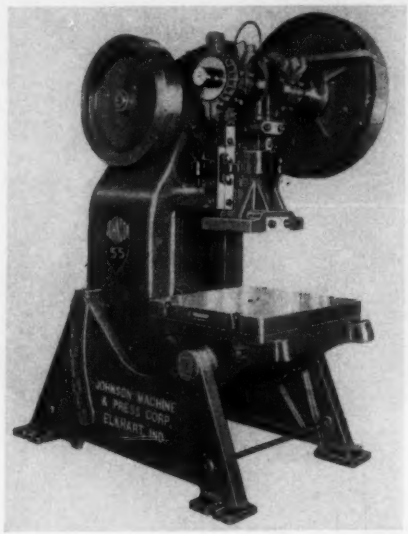
LS-3

Applied quickly to the camlock spindle nose of either lathe, the collet adapter takes standard collet and accommodates sizes handling from ⅛ to 1-inch round stock. The new attachment is available only for factory application to these two lathes.

Check No. 14 on Reply Card for more Details

Wide Range Inclinable Press

Featuring a 32 x 34-inch bolster plate, a 14 x 18-inch ram face and a large die space with 14-inch standard to 18-inch maximum opening, the model 55 inclinable press announced by Johnson Machine & Press Corp., Elkhart, Ind., has a 20-inch opening



through the back. An interchangeable thin steel bolster is available to provide still greater die space without sacrificing strength.

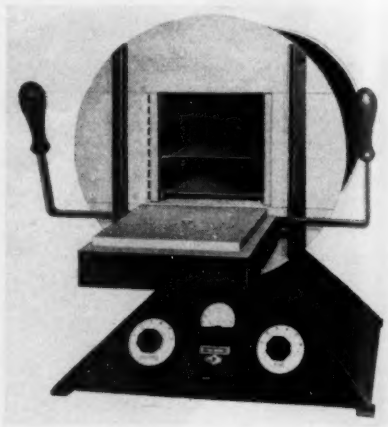
The 56-ton press will handle work up to 16¾ inches deep at 45 pieces per minute either in the vertical or tilted positions up to 36 degrees. A tripping device protects the operator in the event of spring breakage. Press frame is cast semisteel and all points of greater stress are heat treated. Friction type brake may be easily adjusted by turning a small knob.

Check No. 15 on Reply Card for more Details

Rapid Heating Muffle Furnace

Tempering or drawing of tool and die steels is the primary application of the air draw muffle furnace offered by Hevi Duty Electric Co., Milwaukee 1, Wis., although it may be used for practically any heating operation requiring temperatures to 1250° F. A high speed direct-connected centrifugal fan is located at the rear of the chamber with its shaft extending through the rear wall to the drive motor. A heat-resistant alloy baffle is provided to direct the flow of air from the fan through a narrow passage between the heating elements and the baffle, then into the work chamber and back to the fan intake.

High speed air circulation throughout the furnace chamber results in

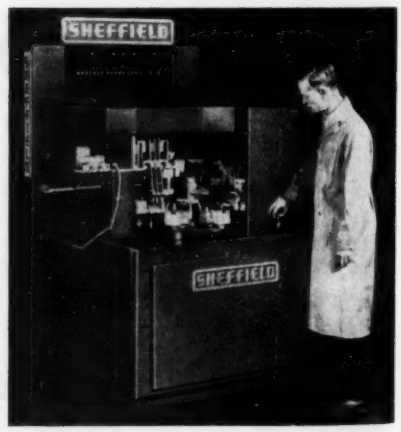


rapid and uniform heating of the work. Adjustable shelves are provided for locating the work at different levels.

Check No. 16 on Reply Card for more Details

Gaging Machine Speeds Output

Automotive connecting rods may be gaged, classified and segregated automatically by the Airlectric machine developed by Sheffield Corp., Dayton



1, O. The machine makes the job of checking critical dimensions easier, increases manpower productivity and enables checking on a mass production basis.

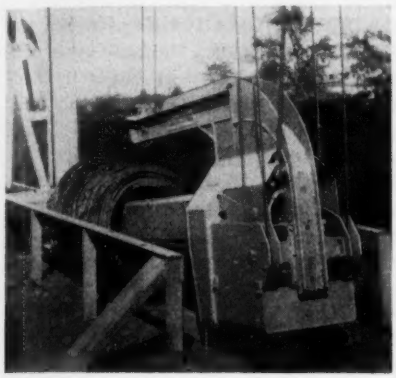
Rods are gaged completely for all critical dimensions and conditions, stamped with proper classification and suitably segregated at the rate of one every 5 seconds. Dimensions and conditions checked include true diameter, average diameter, out-of-round, taper, squareness of face with bore, center distance between holes, width, bend and twist. The one operator loads the rods on eight continu-

ously rotating indexing platforms. Machine is built to withstand continuous operation.

Check No. 17 on Reply Card for more Details

Hook for Vertical Stacking

Increasing of rod or wire warehouse storage capacity is possible with a vertical stacking hairpin hook and carrier developed by Cleveland Tramrail Division, Cleveland Crane



& Engineering Co., Wickliffe, O. Unit will handle 10 coils of 330 pounds each at one time, picking them up from a horizontal position and placing them in vertical piles supported by floor posts. The reverse operation also may be performed.

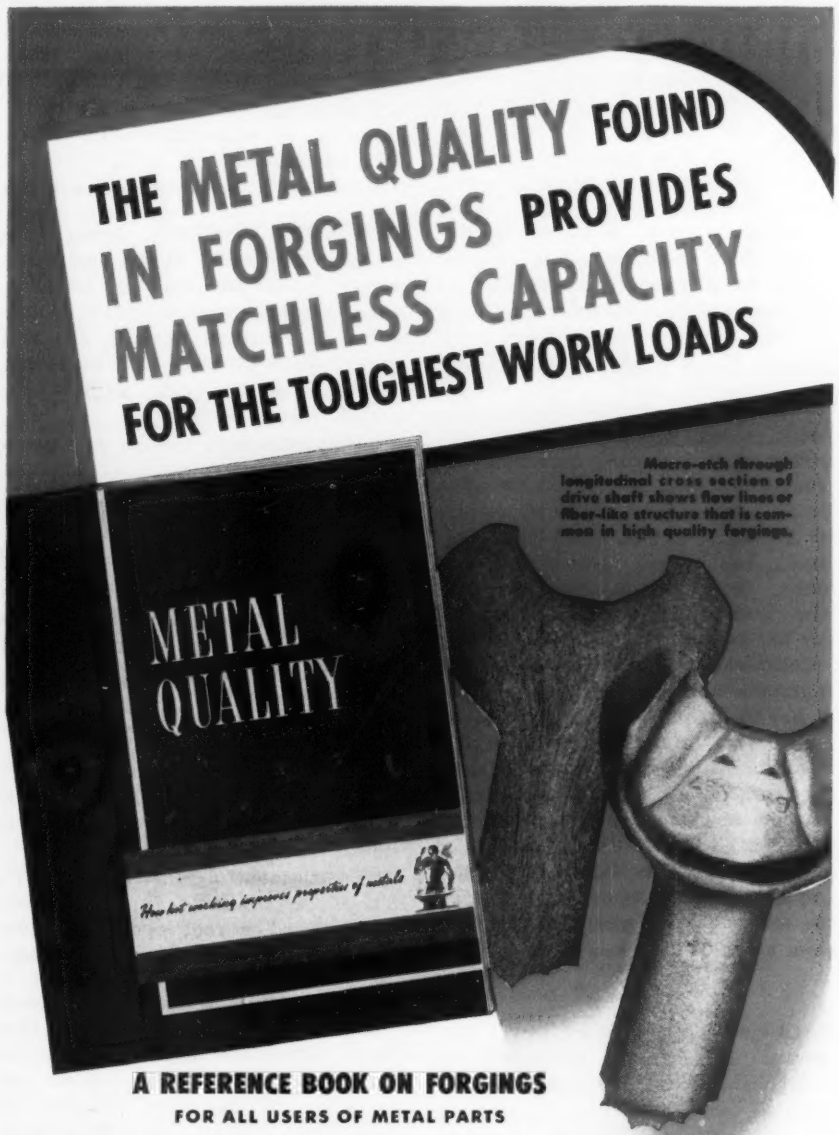
Grab mechanism is actuated by a built-in hydraulic pump which causes a spreader plate to expand or retract. All motions of the hook are controlled from crane operator's cab.

Check No. 18 on Reply Card for more Details

High Speed Cutoff Machine

An abrasive metal cutoff machine, made by Stone Machinery Co. Inc., 349 Fayette St., Manlius, N. Y., cuts up to 3-inch solids and 4-inch pipe

in both ferrous and nonferrous materials. Featuring a 5 hp geared-in-head motor drive and a self-centering vise adaptable to most contours and shapes, the "swing-cut" machine


THE METAL QUALITY FOUND IN FORGINGS PROVIDES MATCHLESS CAPACITY FOR THE TOUGHEST WORK LOADS
METAL QUALITY
How hot working improves properties of metals
Macro-etch through longitudinal cross section of drive shaft shows flow lines or fiber-like structure that is common in high quality forgings.

A REFERENCE BOOK ON FORGINGS

FOR ALL USERS OF METAL PARTS

Sixty pages of authoritative information on metal quality as developed in forgings formed through the use of closed impression dies. Forging production techniques are described and illustrated; economic advantages of forgings are presented from the viewpoint of top management, design engineers, metallurgists and production executives. Your copy is ready. Fill in and attach coupon below to your business letterhead.

* * *

A product fortified with the metal quality found in forgings outperforms other products. Forgings' grain structure and fiber-like flow lines are controlled, directioned, and concentrated at points where the highest stress and shock occur under actual service conditions. High tensile and impact strength, the reduction of dead weight, and freedom from concealed defects are some of the advantages which are obtainable in forgings.

Now is an excellent time to check your product for cost reductions—explore every possibility to improve performance and appearance, while reducing dead weight of component parts. Double check all parts subject to the greatest stress and strain. Check machining and finishing time schedules—forgings have been known to speed up production by 250 per cent. Rejects at the point of assembly are costly—a needless waste; forgings offer practically a 100 per cent yield of sound parts—and they respond uniformly to heat treatment. Consult a forging engineer—only a forging engineer can inform you fully regarding the many advantages obtainable with forgings.

DROP FORGING ASSOCIATION

605 HANNA BUILDING

CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality – How Hot Working Improves Properties of Metal", 1949 Edition.

Name .....

Position .....

Company .....

Address .....

has a waist-high work level which cuts operator fatigue.

Rigid construction plus positive holding increase wheel life by accomplishing straight cuts to close tolerances with a minimum of burr. High operating speed reduces possibility of burn in the metal. Vise is mounted on a swivel plate for change from straight to 90 degree cutting to any desired angle.

Check No. 19 on Reply Card for more Details

Spindle Nose Lathe Collet Chuck

Composed of special Hycar synthetic rubber which is bonded and mechanically locked to hardened and ground tool steel jaws, the new spindle nose lathe collet chuck developed by Jacobs Mfg. Co., West Hartford, Conn., has a full ⅛-inch gripping range. On this basis, eleven Rubber-Flex collets are needed to chuck any bar between 1/16 and 1⅜ inches.

Collet chuck hand wheel is of solid aluminum and all working parts are of hardened and ground alloy steel. Chuck body is an alloy steel forging which is hardened and ground. Models available are for camlock, taper key drive, American Standard and threaded spindles. Work is easily tightened and loosened in the chuck and a special impact mechanism locks the work in place and frees it.

Check No. 20 on Reply Card for more Details

• • •

VALVES: Three-way air valves designated as FT-102, developed by Mead Specialties Co., Chicago 41, Ill., have ⅜-inch pipe thread apertures for use with air cylinders up to 6-inch bore, and operate by a light touch on handle-lever button. Model FC-102 does not have the lever and operates by a cam or trigger on the working machine.

Check No. 21 on Reply Card for more Details

GRINDER—For operation of grinding wheels of ½-inch diameter and smaller, a 15-ounce pneumatic grinder is announced by Keller Tool Co., Grand Haven, Mich. Known as 30A-7, it has a speed of 75,000 rpm.

Check No. 22 on Reply Card for more Details

RESIN BINDER: A liquid, synthetic resin binder for sand cores and dry molds is announced by American Cyanamid Co., New York 20, N. Y. Known as Cycor 191, it can be pumped and/or metered.

Check No. 23 on Reply Card for more Details

FIXTURE HANGER: SFH fixture hanger for fluorescent lighting fixtures is manufactured with a pair of snug fitting clips which hook firmly to the ears of the outlet box. Equipped with pear-shaped screw holes, it may be mounted in place without removing screws from outlet box. Made by Appleton Electric Co., Chicago 13, Ill., it is available with two-wire receptacle or with three-wire, twist-lock receptacle.

Check No. 24 on Reply Card for more Details

HANDLING BASKET: Jaxon Wire Products, Jackson, Mich., announces heavy mesh baskets for handling small and medium-sized parts. Open mesh construction permits oils and other liquids to drain off. Parts can be run through baths without removal from baskets.

Check No. 25 on Reply Card for more Details

PILLOWBLOCK: Silver Engineering Works Inc., Denver 5, Colo., offers a pillowblock with U-bolt construction, Timken double row bearings and self-aligning design. It is recommended for use with commercial grade shafting, structural steel and wherever shock, dust or weather is a problem.

Check No. 26 on Reply Card for more Details

PILOT VALVES: Hanna Engineering Works, Chicago 22, Ill., announce a series of small pilot valves for direct control of small cylinders or automatic control of large cylinders. They are available in cam, lever, pushbutton or foot operated types.

Check No. 27 on Reply Card for more Details

COLLAPSIBLE BOX: Truscon Steel Co., Cleveland 4, O., offers a new steel collapsible box that can be readily set up or knocked down and is easily handled with platform or fork truck. When in position sides are locked by pin and slide bolt arrangement. Box can be tiered, loaded or empty, when set up.

Check No. 28 on Reply Card for more Details

ELECTRODE: EutecTrode 4/49 for alternating or direct current is introduced by Eutectic Welding Alloys Corp., New York 13, N. Y., for welding manganese steel or for overlaying work. It has a Rockwell hardness of C 26-34 and is available in sizes 3/16, 5/32 and ⅛-inch.

Check No. 29 on Reply Card for more Details

RESIN COATING: Carboline Co., St. Louis 5, Mo., is offering a new type of corrosion resisting resin coating that is made for application at room temperature, requires no mixing and is flexible when dry. It is resistant to high concentration acids, high liquid temperatures, and to such solvents as the alcohols and straight chain chlorinated and aromatic hydrocarbons. A limited quantity is available at no charge for experimental and test purposes.

Check No. 30 on Reply Card for more Details

ADAPTERS: Kase Machine Co., Cleveland 19, O., offers tapered eccentric bushing-type adapters which have been developed to facilitate cutting of tapered keyways in straight bores, straight keyways in tapered bores and tapered keyways in tapered bores with company's standard Glenny broaches. Available in sizes ranging from ½ to 2 inches in increments of 1/32-inch.

Check No. 31 on Reply Card for more Details

BATTERY CHARGER: Known as KX Charg-O-Matic, the new type battery charger offered by Hertner Electric Co., Cleveland, O., is of the fully automatic motor-generator type, single circuit. Electrically driven selective time clock switch provides automatic cutoff at end of charging period.

Check No. 32 on Reply Card for more Details

FIXTURE AND STAND: Model 135 all purpose sharpening fixture for sharpening carbide tipped tools, cutters and all types of circular saws from 1½ to 12 inches in diameter and model 300 dustproof ball bearing grinding wheel stand are announced by Treyco Products, Buffalo 17, N. Y. Stand is designed for two grinding wheels, one at each end of the shaft.

Check No. 33 on Reply Card for more Details

FINISHER: Smooth, vibrationless operation and straight line sanding, rubbing and polishing are features of the new portable, electric model DF finisher, announced by Detroit Surfacing Machine Co., Detroit 4, Mich. Straight line sanding duplicates natural back and forth motion of hand work.

Check No. 34 on Reply Card for more Details

COMBUSTION SAFEGUARD: Bristol Co., Waterbury, Conn., has developed a new combustion safeguard known as electronic Pyrotrol. It protects gas-fired furnaces, ovens, kilns, boilers, dryers, kettles and other similar industrial heating equipment from danger of gas explosions during ignition, operation and shut off. If normal operation fails at any step, lighting up cycle stops and closes any valve that has opened.

Check No. 35 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

CREEPING industrial paralysis threatens the metalworking industry due to the steel and coal strikes. Unprecedented contraction of activities is predicted next month unless the labor disputes are settled. Time is running out; steel is running short. While comparatively few fabricators have curtailed operations to date for lack of steel, the number will grow daily. And consumers' inventories will begin to evaporate or become too unbalanced to permit economical production in many plants by end of October. Some order cancellations are coming from shops unable to maintain processing schedules. End-use cancellation of castings is noted with some consumers running shy of steel for certain assemblies. Wholesale shutdowns are expected as the effect of the strikes fans out to embrace an ever-widening area of the economy.

LABOR— No end of the steel strike is yet in sight despite efforts of government mediators to lay groundwork for settlement. A number of small steelmakers and fabricators have accepted the union's pension and insurance terms but such action is not considered indicative of the way the wind is blowing. More steelworks and fabricating shops are being struck as their union contracts expire.

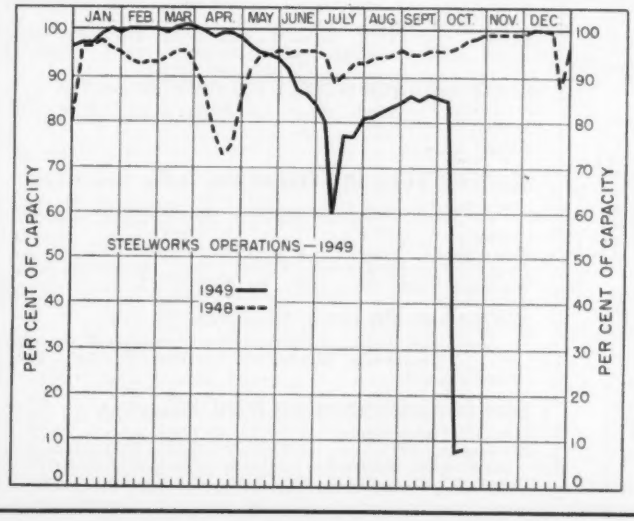
OPERATIONS— For the second successive week production of steel ingots and castings fell below the 200,000-ton mark. This compares with pre-strike weekly output of around 1,500,000 tons. The estimated national ingot rate rose fractionally to 8 per cent of capacity.

SUPPLIES— Size of consumer steel inventories at beginning of the third week of the steel walkout varies widely. At strike's start stocks averaged about 30-days' supply. But manufacturers have been chewing metal up at a fast pace, putting a big dent in what two weeks ago appeared to be comfortable supplies. Some larger manufacturers are well fixed and can keep their components suppliers going for a while. But the situation looms increasingly serious each day the strike is prolonged.

DEMAND— Growing maladjustment in metalworking plants is reflected in intensified efforts to get in supplies. Warehouses are entertaining inquiry swollen far beyond normal. Growing disposition by consumers to take in extra-premium priced steel is noted. The few steel mills still operating are in receipt of far more inquiry than they can handle in most items. Exceptions may be in plates and certain types of wire. Pressure for the flat-rolled products is extremely heavy. Looking beyond the strike, some buyers are seeking sheets for first quarter delivery but tonnage is being declined except from regular customers. Railroads are placing rail orders for 1950 delivery.

PRICES— Some uncertainty prevails over the steel price trend. This arises from increases just effected by several small steelmakers that have accepted the union's pension and insurance demands. In the main it is believed the price line will hold but there is no certainty of this. Over the past ten days the John A. Roebling's Sons Co. and the Seneca Wire & Mfg. Co. raised prices on several items $10 per ton. An increase of $5 per ton on plates also was made by Central Steel Division, Barium Steel Corp.

COMPOSITES— STEEL's weighted index of finished steel holds unchanged at 152.52. Arithmetical price composite on finished steel advanced to $91.64 from $91.55, reflecting an upward revision in plate prices by one eastern seller. This compares with $95.05 a year ago. The steelmaking scrap composite eased to $26.75 from $27.25 and compares with $43.25 a year ago. Scrap is moving slowly but the undertone continues strong. Composites on pig iron are unchanged and compare with a year ago as follows: Basic iron, $45.60 and $46.29; No. 2 foundry, $46.10 and $46.50; malleable iron, $47.27 and $47.20.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Oct. 15	Change	Same Week 1948	Same Week 1947
Pittsburgh	3.5	None	96.5	105
Chicago	4.5	— 1.5	97.5	95
Eastern Pa.	8.5	+ 1	94	91.5
Youngstown	0	None	10[illegible]	92
Wheeling	59.5	+ 0.5	90	93.5
Cleveland	0	None	98.5	92
Buffalo	0	None	104	88.5
Birmingham	6	+ 2	100	99
New England	52	None	87	84
Cincinnati	46	— 6	103	94
St. Louis	89.5	+ 5	89.5	80
Detroit	0	None	101	88
Western	21	+ 1	..	..
Estimated national rate	8	+ 0.5	98	96

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947.

News Summary—P. 41 *Engineering News—P. 71*

Composite Market Averages

	Oct. 13 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.132	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT.....	$91.64	$91.55	$91.55	$95.05	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.50	23.67
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.20	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT..	26.75	27.25	26.92	43.25	16.55

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Oct. 13 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pitts.	3.35	3.35	3.35	3.45	2.15
Bars, H.R., del. Phila. ...	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pitts.	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C.F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pitts.	3.25	3.25	3.25	3.25-30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.40-60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa...	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pitts.	3.25	3.25	3.25	3.25-30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pitts.	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pitts.	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pitts.	3.25	3.25	3.25	3.25-70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25-30	2.10
Strip, C.R., Pitts.	4.00	4.00	4.00	4.00-75	2.80
Strip, C.R., Chicago	4.00-15	4.00-15	4.00-15	4.00-25	2.90
Strip, C.R., Detroit	4.20-25	4.20-25	4.20-25	4.20-50	2.90
Wire, Basic, Pitts.	4.15	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pitts.	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pitts.	$7.75	$7.75	$7.75	$6.80	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Wire rods, ½-⅝", Pitts. ..	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago.....	46.50	46.50	46.50	43.00-46.50	24.00
No. 2 Fdry, Valley.....	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham..	39.38	39.38	39.38	43.38	20.38
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	43.50-46.50	24.00
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	135.00

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts. ..	$29.75	$29.75	$29.75	$42.75	$17.75
No. 1 Heavy Melt. E. Pa..	25.00	25.00	24.50	45.25	15.50
No. 1 Heavy Melt. Chicago	25.50	27.00	26.50	41.75	16.50
No. 1 Heavy Melt. Valley..	31.25	31.25	29.50	42.75	16.25
No. 1 Heavy Melt. Cleve...	26.50	26.50	25.00	42.25	15.25
No. 1 Heavy Melt. Buffalo.	28.25	28.25	26.25	48.25	17.00
Rails, Rerolling, Chicago..	41.50	41.50	41.50	64.50	22.25
No. 1 Cast, Chicago	41.50	41.50	41.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl. .	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.75	15.75	15.75	17.00	7.75
Oven, Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	17.625	17.625	17.625	23.50	12.00
Zinc, E. St. Louis	9.25	9.25	10.00	15.00	8.25
Lead, St. Louis	13.55	14.50	14.925	19.30-35	6.35
Tin, New York	96.00	96.00	103.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	38.50	38.50	38.50	14.50
Nickel, refinery, duty paid	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.

Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.13	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston,del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich.del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Lorain,O. N3	46.00	....	....	47.00
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg., del.	....	54.20	....	....
LosAngeles,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
LoneStar,Tex. L6	46.00	*46.50	....	....
Gulf ports,del.	50.50	51.00	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N&S sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

* Low phos, Southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SIVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry, 12½ lb, piglets, frt. allowed K2..	82.00
Wenatchee,Wash. OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.09
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices on Oct. 13, 1949; cents per pound, unless otherwise noted. Price changes are indicated by italic type.
Code number following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7 .....$50.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)

Detroit R7 .....$51.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ...51.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. C3 .....$52.00
Clairton,Pa. C3 .....52.00
Conshohocken,Pa. A3 ..57.00
Ensley,Ala. T2 .....52.00
Fairfield,Ala. T2 .....52.00
Fontana,Calif. K1 ....71.00
Gary,Ind. C3 .....52.00
Johnstown,Pa. B2 .....52.00
Lackawanna,N.Y. B2 ..52.00
Munhall,Pa. C3 .....52.00
Sharon,Pa. S3 .....52.00
So.Chicago,Ill. C3 ...52.00
So.Duquesne,Pa. C3 ...52.00

Carbon, Forging (NT)

Bessemer,Pa. C3 .....$61.00
Buffalo R2 .....61.00
Canton,O. R2 .....61.00
Clairton,Pa. C3 .....61.00
Cleveland R2 .....61.00
Conshohocken,Pa. A3 ..63.00
Detroit R7 .....61.00
Ensley,Ala. T2 .....61.00
Fairfield,Ala. T2 .....61.00
Fontana,Calif. K1 ....80.00
Gary,Ind. C3 .....61.00
Geneva,Utah G1 .....61.00
Houston,Tex. S5 .....69.00
Ind.Harbor,Ind. I-2 ...61.00
Johnstown,Pa. B2 ....61.00
Lackawanna,N.Y. B2 ..61.00
Munhall,Pa. C3 .....61.00
So.Duquesne,Pa. C3 ..61.00
So.Chicago,Ill. C3, R2..61.00
Warren,O. C17 .....61.00

Alloy (NT)

Bethlehem,Pa. B2 ....$63.00
Buffalo R2 .....63.00
Canton,O. R2, T7 .....63.00
Conshohocken,Pa. A3 ..65.00
Detroit R7 .....63.00
Fontana,Calif. K1 ....82.00
Gary,Ind. C3 .....63.00
Houston,Tex. S5 .....71.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2 ..63.00
Massillon,O. R2 .....63.00
Midland,Pa. C18 .....63.00
Munhall,Pa. C3 .....63.00
Sharon,Pa. S3 .....63.00
So.Chicago,Ill. C3, R2..63.00
So.Duquesne,Pa. C3 ...63.00
Warren,O. C17 .....63.00

SHEET BARS (NT)

Mansfield,O. E6..(GT)$60.00
Portsmouth,O. P12 ....52.00
Sharon,Pa. S3 .....52.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Ind.Harbor,Ind. I-2 ....76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00

SKELP

Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.25
Warren,O. R2 .....3.25
Youngstown C3, R2 ....3.25

WIRE RODS

AlabamaCity,Ala. R2 ..3.40
Cleveland A7 .....3.40
Donora,Pa. A7 .....3.40
Fairfield,Ala. T2 .....3.40
Houston,Tex. S5 .....3.95
Ind.Harbor,Ind. Y1 ....3.40
Johnstown,Pa. B2 .....3.40
Joliet,Ill. A7 .....3.40
LosAngeles B3 .....4.20
Monessen,Pa. P7 .....3.40
Pittsburg,Calif. C11 ...4.05
Portsmouth,O. P12 .....3.40
So.Chicago,Ill. R2 .....3.40
SparrowsPoint B2 .....3.50
Sterling,Ill.(1) N15 ....3.40
Struthers,O. Y1 .....3.40
Torrance,Calif. C11 ....4.20
Worcester,Mass. A7 ....3.70

STRUCTURALS

Wide Flange

Bethlehem,Pa. B2 .....3.30
Lackawanna,N.Y. B2 ..3.30
Munhall,Pa. C3 .....3.20
So.Chicago,Ill. C3 .....3.20

H.-S. Low-Alloy

Aliquippa,Pa. J5 .....4.95
Bessemer,Ala. T2 .....4.95
Bethlehem,Pa.(14) B2 ..5.05
Clairton,Pa. C3 .....4.95
Fairfield,Ala. T2 .....4.95
Fontana,Calif. K1 .....6.10
Gary,Ind. C3 .....4.95
Ind.Harbor,Ind. I-2, Y1 .4.95
Johnstown,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa.(14) C3 ....4.95
So.Chicago,Ill.(14) C3 ..4.95
Struthers,O. Y1 .....4.95

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 .....3.25
Bessemer,Ala. T2 .....3.25
Bethlehem,Pa. B2 .....3.30
Clairton,Pa. C3 .....3.25
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....3.80
Gary,Ind. C3 .....3.25
Geneva,Utah G1 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I-2 ....3.25
Johnstown,Pa. B2 .....3.30
KansasCity,Mo. S5 ....3.85
Lackawanna,N.Y. B2 ...3.30
LosAngeles B3 .....3.85
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.25
Niles,Calif.(22) P1 ....3.97
Portland,Oreg. O4 .....3.90
Seattle B3 .....3.90
So.Chicago,Ill. C3, W14 .3.25
So.SanFrancisco B3 ....3.80
Torrance,Calif. C11 ....3.85
Weirton,W.Va. W6 .....3.25

Alloy Stand. Shapes

Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 ....4.05

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 .....4.05
Lackawanna,N.Y. B2 ....4.05
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05
Weirton,W.Va. W6 .....4.05

PLATES Carbon Steel

AlabamaCity,Ala. R2 ...3.40
Aliquippa,Pa. J5 .....3.40
Ashland,Ky.(15) A10 ...3.40
Bessemer,Ala. T2 .....3.40
Clairton,Pa. C3 .....3.40
Claymont,Del. W16 ....3.50
Cleveland J5, R2 .....3.40
Coatesville,Pa. L7 .....3.50
Conshohocken,Pa. A3 ...3.50
Ecorse,Mich. G5 .....3.65
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Harrisburg,Pa. C5 .....3.75
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2, Y1 .3.40
Johnstown,Pa. B2 .....3.40
Lackawanna,N.Y. B2 ....3.40
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.40
Pittsburgh J5 .....3.40
Seattle B3 .....4.30
Sharon,Pa. S3 .....3.40
So.Chicago,Ill. C3, W14 .3.40
SparrowsPoint,Md. B2 ..3.40
Steubenville,O. W10 ....3.40
Warren,O. R2 .....3.40
Weirton,W.Va. W6 .....3.40
Youngstown C3, Y1 ....3.40

PLATES (Universal Mill)

Fontana,Calif. K1 .....4.30

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ..4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

PLATES, Ingot Iron

Ashland,cl(15) A10 ....3.65
Ashland,lcl(15) A10 ....4.15
Cleveland,cl R2 .....3.65
Warren,O.,cl R2 .....3.65

PLATES, Wrought Iron

Economy,Pa. B14 .....7.85

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland J5, R2 .....5.20
Conshohocken,Pa. A3 ...5.20
Ecorse,Mich. G5 .....5.45
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....5.80
Gary,Ind. C3 .....5.20
Geneva,Utah G1 .....5.20
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 .5.20
Johnstown,Pa. B2 .....5.20
Munhall,Pa. C3 .....5.20
Pittsburgh J5 .....5.20
Sharon,Pa. S3 .....5.65
So.Chicago,Ill. C3 .....5.20
SparrowsPoint,Md. B2 ..5.20
Warren,O. R2 .....5.20
Youngstown Y1 .....5.20

FLOOR PLATES

Cleveland J5 .....4.55
Conshohocken,Pa. A3 ...4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ...3.35
Aliquippa,Pa. J5 .....3.35
Alton,Ill.(1) L1 .....3.35
Ashland,Ky.(17) A10 ..3.35
Atlanta,Ga. A11 .....3.50
Bessemer,Ala. T2 .....3.35
Buffalo R2 .....3.35
Canton,O. R2 .....3.35
Clairton,Pa. C3 .....3.35
Cleveland R2 .....3.35
Ecorse,Mich. G5 .....3.55
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1..3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ...3.35
LosAngeles B3 .....4.05
Midland,Pa. C18 .....3.35
Milton,Pa. B6 .....3.35
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.05
N.Tonawanda,N.Y. B11.3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle B3, N14 .....4.10
S.Chicago C3, R2, W14..3.35
So.Duquesne,Pa. C3 ....3.35
S.SanFran.,Cal. B3 ....4.10
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Weirton,W.Va. W6 ....3.35
Youngstown C3, R2 ....3.35

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 .....4.00
Ambridge,Pa. W18 .....4.00
BeaverFalls,Pa. M12, R2...4.00
Buffalo B5 .....4.00
Camden,N.J. P13 .....4.48
Carnegie,Pa. C12 .....4.00
Chicago W18 .....4.00
Cleveland A7, C20 .....4.00
Cumberland,Md. C19 ...3.95
Donora,Pa. A7 .....4.00
Ecorse,Mich. G5 .....4.30
Elyria,O. W8 .....4.00
FranklinPark,Ill. N5 ...4.00
Gary,Ind. R2 .....4.00
Hammond,Ind. L2, M13..4.00
Hartford,Conn. R2 .....4.40
Harvey,Ill. B5 .....4.00
Indianapolis M13 .....4.20
LosAngeles R2 .....5.40
Mansfield,Mass. B5 ....4.40
Massillon,O. R2, R8.....4.00
Midland,Pa. C18 .....4.00
Monaca,Pa. S17 .....4.00
Newark,N.J. W18 .....4.40
Plymouth,Mich. P5 ....4.25
Pittsburgh J5 .....3.95
Putnam,Conn. W18 ....4.40
Readville,Mass. C14 ...4.40
St.Louis,Mo. M5 .....4.35
So.Chicago,Ill. W14 ....4.00
SpringCity,Pa.(5) K3 ..4.48
Struthers,O. Y1 .....4.00
Waukegan,Ill. A7 .....4.00
Youngstown F3, Y1 ....4.00

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....3.35
Atlanta,Ga. A11 .....3.50
Bethlehem,Pa.(2) B2 ..3.55
Johnstown,Pa. B2 .....3.35
Lackawanna,N.Y. B2 ..3.35
Niles,Calif. P1 .....4.05
Pittsburgh(23) J5 .....3.35
Portland,Oreg. 04 .....4.10
SanFrancisco S7 .....4.05
Weirton,W.Va. W6 .....3.35

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 .....4.00
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....4.00
Youngstown C3 .....4.00

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.10
Bessemer,Ala. T2 .....5.10
Bethlehem,Pa. B2 .....5.10
Clairton,Pa. C3 .....5.10
Cleveland R2 .....5.10
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.10
Fontana,Calif. K1 .....6.15
Gary,Ind. C3 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
Pittsburgh J5 .....5.10
So.Duquesne,Pa. C3 ....5.10
Struthers,O. Y1 .....5.10
Youngstown C3 .....5.10

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....3.75
Buffalo R2 .....3.75
Canton,O. R2, T7 .....3.75
Clairton,Pa. C3 .....3.75
Ecorse,Mich. G5 .....4.05
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....3.75
Houston,Tex. S5 .....4.15
Ind.Harbor,Ind. I-2, Y1..3.75
Johnstown,Pa. B2 .....3.75
KansasCity,Mo. S5 .....4.35
Lackawanna,N.Y. B2 ...3.75
LosAngeles B3 .....4.80
Massillon,O. R2 .....3.75
Midland,Pa. C18 .....3.75
S.Chicago C3, R2, W14..3.75
So.Duquesne,Pa. C3 ...3.75
Struthers,O. Y1 .....3.75
Warren,O. C17 .....3.75
Youngstown C3 .....3.75

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 .....4.65
Ambridge,Pa. W18 .....4.65
BeaverFalls,Pa. M12 ...4.65
Bethlehem,Pa. B2 .....4.65
Buffalo B5 .....4.65
Canton,O. R2, T7 .....4.65
Carnegie,Pa. C12 .....4.65
Chicago W18 .....4.65
Cleveland A7, C20 .....4.65
Donora,Pa. A7 .....4.65
Elyria,O. W8 .....4.65
Gary,Ind. R2 .....4.65
Hammond,Ind. L2, M13..4.65
Hartford,Conn. R2 .....4.95
Harvey,Ill. B5 .....4.65
Indianapolis M13 .....4.85
Lackawanna,N.Y. B2 ..4.65
Mansfield,Mass. B5 ....4.95
Massillon,O. R2, R8....4.65
Midland,Pa. C18 .....4.65
Monaca,Pa. S17 .....4.65
Newark,N.J. W18 .....4.95
So.Chicago,Ill. R2, W14.4.65
Struthers,O. Y1 .....4.65
Waukegan,Ill. A7 .....4.65
Worcester,Mass. A7 ....4.95
Youngstown F3, Y1 ....4.65

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 ...3.35
Alton,Ill.(6) L1 .....3.35
Atlanta,Ga. A11 .....3.50
Buffalo R2 .....3.35
Cleveland R2 .....3.35
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1..3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ..3.35
LosAngeles B3 .....4.05
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.05
Pittsburg,Calif. C11 ...4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle,Wash. B3, N14..4.10
So.Chicago,Ill. R2 .....3.35
So.Duquesne,Pa. C3 ...3.35
So.SanFrancisco B3 ....4.10
SparrowsPoint,Md. B2 ..3.35
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Youngstown C3, R2 ....3.35

BARS, Reinforcing (Fabricated; to Consumers)

Huntington,W.Va. W7 ..4.50
Johnstown,¼-1" B2 ....4.25
LosAngeles B3 .....5.00
Pittsburgh J5 .....4.25
Seattle B3, N14 .....5.00
So.SanFrancisco B3 ....5.00
SparrowsPt.,1⅛-1¼" B2.4.83
SparrowsPt.,¼-1" B2 ..4.25

RAIL STEEL BARS

ChicagoHts.,Ill.(3) I-2..3.25
FortWorth,Tex.(4) T4 ..4.33
Hntngtn,W.Va.(3,4) W7.3.35
Moline,Ill.(3) R2 .....3.35
Williamsport(2,3) S19 ..3.35
Williamsport(4) S19 ....3.85

BARS, Wrought Iron

Economy,Pa.(S.R.)B14..9.50
Economy,Pa.(D.R.)B14.11.00
Economy(Stablt) B14 ..11.30
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10 ..3.66

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 ..3.25
Ashland,Ky.(8) A10 ...3.25
Butler,Pa. A10 .....3.25
Cleveland J5, R2 .....3.25
Conshohocken,Pa. A3 ..3.35
Ecorse,Mich.(8) G5 ....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....4.15
Gary,Ind. C3 .....3.25
Ind.Harbor,Ind. I-2, Y1..3.25
Irvin,Pa. C3 .....3.25
Kokomo,Ind. C16 .....3.35
Lackawanna,N.Y. B2 ...3.25
Munhall,Pa. C3 .....3.25
Pittsburg,Calif. C11 ....3.95
Pittsburgh J5 .....3.25
Sharon,Pa. S3 .....3.25
So.Chicago,Ill. W14 ....3.25
SparrowsPoint,Md. B2 ..3.25
Steubenville,O. W10 ....3.25
Torrance,Calif. C11 ....3.95
Warren,O. R2 .....3.25
Weirton,W.Va. W6 ....3.25
Youngstown C3, Y1 ....3.25

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 ...4.40
Dover,O. R1 .....5.00
Fairfield,Ala. T2 .....4.15
Ind.Harbor,Ind. I-2 ....4.15
Kokomo,Ind. C16 .....4.25
Mansfield,O. E5 .....4.15
Niles,O. N12, M4 .....4.15
Torrance,Calif. C11 ....5.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.00
Cleveland J5 R2 .....4.00
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.00
Follansbee,W.Va. F4 ....4.00
Fontana,Calif. K1 .....4.90
Gary,Ind. C3 .....4.00
GraniteCity,Ill. G4 .....4.20
Ind.Harbor,Ind. I-2, Y1..4.00
Irvin,Pa. C3 .....4.00
Lackawanna,N.Y. B2 ...4.00
Middletown,O. A10 .....4.00
Pittsburg,Calif. C11 ...4.95
Pittsburgh J5 .....4.00
SparrowsPoint,Md. B2 ..4.00
Steubenville,O. W10 ....4.00
Warren,O. R2 .....4.00
Weirton,W.Va. W6 .....4.00
Youngstown Y1 .....4.00

SHEETS, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5, R2 .....6.05
Ecorse,Mich. G5 .....6.25
Fontana,Calif. K1 .....6.95
Gary,Ind. C3 .....6.05
Ind.Harbor,Ind. I-2, Y1..6.05
Irvin,Pa. C3 .....6.05
Lackawanna,N.Y. B2 ...6.05
Pittsburgh J5 .....6.05
Sharon,Pa. S3 .....6.05
SparrowsPoint,Md. B2 ..6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 .....6.05
Youngstown Y1 .....6.05

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I-2, Y1	4.95
Irvin,Pa. C3	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
So.Chicago,Ill. C3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	5.40
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.40
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3	6.75
SparrowsPoint,Md. B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	4.95

SHEETS, Zincgrip No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2	5.15
Niles,O. R2	5.15
Weirton,W.Va. W6	5.00

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu FE
Ashland A10	5.00	...
Canton,O. R2	5.05	5.50
Fairfield,Ala. T2	5.00	5.35
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
MartinsFy,O. W10	5.00	5.35
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Weil Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, Aluminized

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I-2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Gary,Ind. C3	8.95
Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I-2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.95

SHEETS, Zincgrip No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.40
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I-2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill. G4	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Cleveland J5	3.25
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary, Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Carbon

Berea,O. C7	5.10
Bridgeprt,Conn.(10) S15	4.00
Butler,Pa. A10	4.00
Chicago,Ill. T6	4.15
Cleveland A7, J5	4.00
Detroit D2, D3	4.25
Detroit M1	4.20
Dover,O. G6	4.00
Ecorse,Mich. G5	4.20
Follansbee,W.Va. F4	4.00
Fontana,Calif. K1	4.90
Ind.Harbor,Ind. I-2	4.00
Lackawanna,N.Y. B2	4.00
LosAngeles C1	5.00
Mattapan,Mass.(21) T6	4.50
Middletown,O. A10	4.00
NewBritain(10) S15	4.00
New Castle, Pa. B4, E5	4.00
NewHaven,Conn. A7, D2	4.50
NewKensington,Pa. A6	4.00
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.55
Pawtucket,R.I.(21) N8	4.50
Pawtucket,R.I. R3	4.50
Pittsburgh J5	4.00
Riverdale,Ill. A1	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.00
Trenton,N.J.(13) R5	*5.00*
Wallingford,Conn. W2	4.50
Warren,O. R2, T5	4.00
Weirton,W.Va. W6	4.00
Youngstown C8, Y1	4.00

STRIP, Cold-Rolled, High-strength Low-Alloy

Cleveland A7, J5	6.05
Dover,O. G6	6.05
Ecorse,Mich. G5	6.25
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.05
Pittsburgh J5	6.05
Sharon,Pa. S3	6.05
SparrowsPoint,Md. B2	6.05
Warren,O. R2	6.05
Weirton,W.Va. W6	6.05
Youngstown Y1	6.05

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.00
Youngstown C8	4.00

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ill. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEET SILICON (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	5.45	5.95	6.70	7.50
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	...	...
Niles,O. M4	5.15	5.45	5.95	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	5.45	5.95	6.70	7.50
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O. R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	8.05	8.60	9.30	10.10
Toronto,O. F4	8.05	8.60	9.30	10.10
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.40-0.60C	0.60-0.80C	0.80-1.05C	1.05-1.35C
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.65	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
NewCastle,Pa. B4	4.00	5.50	6.10	...	....
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. N8					
Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.00	5.50	6.10	8.05	10.35
Trenton,N.J. R5	...	*6.30*	*6.90*	*8.85*	*11.15*
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.05	10.35
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass, T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Key to Producing Companies

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A6	American Shim Steel Co.
A7	American Steel & Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B6	Bolardi Steel Corp.
B8	Braeburn Alloy Steel Co.
B11	Buffalo Bolt Co.
B14	A. M. Byers Co.
C1	Calif. Cold-Rolled Steel
C3	Carnegie-Illinois Steel
C4	Carpenter Steel Co
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Cleve. Cld. Roll. Mills Co.
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia Steel Co.
C12	Col. Steel & Shafting Co.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel Co.
D4	Disston & Sons, Henry
E1	Eastrn. Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Co.
F2	Firth Sterling Steel
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F6	Fretz-Moon Tube Co.
G1	Geneva Steel Co.
G2	Globe Iron Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H4	Heppenstall Co.
H6	Hind Steel Co. Inc.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J7	Judson Steel Corp.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K5	Kidd Drawn Steel Co.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Electric Steel
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Cleveland J5	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.55
Alton,Ill(1) L1	5.55
Bartonville,Ill.(19) K4	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Fostoria,O. S1	*6.05*
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7	5.55
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Trenton,N.J. A7	5.85
Trenton,N.J. R5	*6.35*
Waukegan,Ill. A7	5.55
Worcester A7,J4,T6,W12	5.85

WIRE, Cold-Rolled Flat

Chicago T6	5.35
Cleveland A7	5.00
Dover,O. G6	5.00
Fostoria,O. S1	*5.50*
Kokomo,Ind. C16	5.00
Massillon,O. R8	5.00
Monessen,Pa. P7	5.00
Pawtucket,R.I.(11) N8	5.55
Pawtucket,R.I.(12) N8	5.50
Trenton,N.J. R5	*5.80*
Worcester,Mass. A7	5.30
Worcester,Mass. T6	5.30

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(19) K4	7.70
Chicago W13	7.70
Cleveland A7	7.70
Fostoria,O. S1	7.70
Johnstown,Pa. B2	7.70
Kokomo,Ind. C16	7.70
Portsmouth,O. P12	7.70
Struthers,O. Y1	7.70
Trenton,N.J. R5	*8.50*
Waukegan,Ill. A7	7.70
Worcester,Mass. A7, T6	8.00

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa. J5	4.15
Alton,Ill.(1) L1	4.15
Bartonville,Ill.(1) K4	4.15
Buffalo W12	4.15
Chicago W13	4.15
Cleveland A7, C20	4.15
Crawfrdsvll,Ind. M8	4.30
Donora,Pa. A7	4.15
Duluth A7	4.15
Fairfield,Ala. T2	4.15
Fostoria,O.(24) S1	4.50
Houston S5	4.55
Johnstown,Pa. B2	4.15
Joliet,Ill. A7	4.15
KansasCity,Mo. S5	4.75
Kokomo,Ind. C16	4.25
LosAngeles B3	5.10
Millbury,Mass.(12) N6	4.45
Minnequa,Colo. C10	4.50
Monessen,Pa. P7	4.15
Newark,6-8ga. I-1	4.75
No.Tonawanda B11	4.18
Palmer,Mass. W12	4.45
Pittsburg,Calif. C11	5.10
Portsmouth,O. P12	4.15
Rankin,Pa. A7	4.15
So.Chicago,Ill. R2	4.15
So.SanFrancisco C10	5.10
SparrowsPoint,Md. B2	4.25
Sterling,Ill.(1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	5.10
Waukegan,Ill. A7	4.15
Worcester,Mass. A7,T6	4.45

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Aliquippa J5	9.05	10.55
Bartnvill(19) K4	9.05	10.55
Cleveland A7	9.05	10.55
Fostoria,O. S1	9.15	10.65
Johnstown B2	9.05	10.55
Kokomo C16	9.05	10.10
Minnequa C10	9.40	10.90
Pitts,Cal. C11	9.40	10.90
Prtsmth.(18) P12	9.05	10.55
SparrowsPt., B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
Ala.City, R2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.95	5.40
Bartnville.(19) K4	4.80	5.25
Cleveland A7	4.80	5.25
Crawfrdvll. M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5.	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Pitts.Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
SparrowsPt. B2	4.90	5.35
Sterling,Ill.(1) N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Torrance,Cal. C11	5.75	...
Worcester A7	5.10	5.55

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.20
Alton,Ill.(1) L1	5.20
Cleveland A7	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
LosAngeles B3	6.15
NewHaven,Conn. A7	5.50
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Struthers,O. Y1	5.20
Torrance,Calif. C11	6.15
Trenton,N.J. A7	5.50
Waukegan,Ill. A7	5.20
Worcester,Mass. A7	5.50

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	123
Crawfordsville M8	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburgh,Calif. C11	143
Portsmouth,O.(18) P12	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	143
SparrowsPoint,Md. B2	125
Sterling,Ill(1) N15	123

FENCE POSTS

	Col.
Duluth A7	112
Huntington,W.Va. W7	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa., S19	n.t.$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga.	R2.175
AlabamaCity,Ala.	R2....109
Aliquip.,Pa.9-14½ga.	J5..109
Atlanta A11	111
Bartonville,Ill.(19) K4	109
Crawfordsvll,Ind. M8	112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga.,6"	B2....183
Johnstn,17ga.,4"	B2....186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. P7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18)	P12..109
Rankin,Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop

	Col.
AlabamaCity, Ala. R2	106
Atlanta A11	107
Bartonville,Ill.(19) K4	106
Chicago W13	106
Crawfordsville M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa, Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	106
So.Chicago,Ill. R2	106
So.SanFran.,Calif. C10	130
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.20
Bartonville,Ill.(19) K4	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
Joliet,Ill. A7	5.20
Kokomo,Ind. C16	5.30
Minnequa, Colo. C10	5.55
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
Rankin,Pa. A7	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Worcester,Mass. A7	5.50

NAILS & STAPLES, Stock (To Consumers)

AlabamaCity,Ala. R2	103
Aliquippa,Pa. J5	103
Atlanta A11	105
Bartonville,Ill.(19) K4	103
Cleveland A9	110
Crawfordsville M8	106
Donora,Pa. A7	103
Duluth A7	103
Fairfield,Ala. T2	103
Houston,Tex. S5	111
Johnstown,Pa. B2	103
Joliet,Ill. A7	103
KansasCity,Mo. S5	115
Kokomo,Ind. C16	105
Minnequa, Colo. C10	110
Monessen,Pa. P7	103
Pittsburg,Calif. C11	122
Portsmouth,O. P12	103
Rankin,Pa. A7	103
So.Chicago,Ill. R2	103
SparrowsPoint,Md. B2	105
Sterling,Ill.(1) N15	103
Torrance,Calif. C11	123
Worcester,Mass. A7	109

NAILS & STAPLES, Stock (To Jobbers)

	Col.
Chicago,Ill. W13	103
Minnequa,Colo. C10	107
Portsmouth,O. P12	100

NAILS, Cut (100 lb keg)

Conshohoken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.20
Gary,Ind. C3	5.20
Ind.Harbor,Ind. S13	5.20
Johnstown,Pa. B2	5.20
McKeesRocks,Pa. C3	5.20

TIE PLATES

Fairfield,Ala. T2	4.05
Gary,Ind. C3	4.05
Ind.Harbor,Ind. I-2	4.05
Lackawanna,N.Y. B2	4.05
Minnequa,Colo. C10	4.05
Pittsburg,Calif. C11	4.20
Pittsburgh R2	4.05
Seattle B3	4.50
Steelton,Pa. B2	4.05
Torrance,Calif. C11	4.20
Weirton,W.Va. W6	4.05

JOINT BARS

Bessemer,Pa. C3	4.25
Fairfield,Ala. T2	4.25
Ind.Harbor,Ind. I-2	4.25
Joliet,Ill. C3	4.25
Lackawanna,N. Y. B2	4.25
Minnequa,Colo. C10	4.25
Steelton,Pa. B2	4.25

TRACK BOLTS

	(20)Treated
Fairfield,Ala. T2	8.50
Lebanon,Pa. B2	8.50
Minnequa,Colo. C10	8.25
Pittsburgh,Pa. O3, P14	8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.35
Ind.Harbor,Ind. I-2, Y1	5.35
Lebanon,Pa. B2	5.35
Minnequa, Colo. C10	5.35
Pittsburgh J5	5.35
So.Chicago,Ill. R2	5.35
Struthers,O. Y1	5.35
Youngstown R2	5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7	3.55
Williamsport,Pa. S19	3.55

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	7.10	7.40	7.80
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Fostoria,O. S1	*8.00*	*8.30*	*8.70*
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.30
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. R5	*8.00*	*8.30*	*8.70*
Trenton,N.J. R5	7.50	7.80	8.20
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.50	7.80	8.20

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...	(16)3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

Key to Producing Companies

L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.High Carb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P5 Pilgrim Drawn Steel Crp.
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San. Corp.

U4 Universal Cyclops Steel

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.

Y1 Youngstwn. Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Hi.-Carbon-Cr	52.00	20.25W,4.25Cr,1.6V,12.25Co	266.50
Cr Hot Wrk	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,6Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(8) 16 gage and heavier.
(9) 6" and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage point lower on ⅛", 2 points lower on ¼", 3 points lower ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ⅛" through 3".

Columns B & E: Sparrows Point, Md. B2; Wheatland, Pa., ⅛ through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. Base) LI; Indiana Harbor, Ind., ⅛ through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛ through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛ through ⅜" W9. Following make ½ through 3" only; Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ⅛" through 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 in., inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long	35
⅝ & ¾ x 6 in., shorter	37
¾-in. & larger x 6 in., shorter	34
All diameters longer than 6-in.	30
Tire bolts	25
Plow bolts	47
Lag bolts, 6 in., shorter	37
Lag bolts, longer than 6 in.	35

NUTS

Semifinished hexagon	A.S. Light	Reg. & Heavy
⅞-in., smaller	41 off	....
½-in., smaller	....	38 off
⅝-in.-1-in.	39 off	....
⅞-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in., larger	34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller, ¾, ⅞, & 1 x 6-in. & shorter	51 off
	35 off
Headless, ¼-in., larger	31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter	40 off

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 6.75c

⅞-in., under .....48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2

Baltimore, bars, wire and structurals A10

Brackenridge, Pa., sheets A4

Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4

Butler, Pa., sheets and strip except Types 309, 501 & 502 A10

Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18

Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7

Detroit, strip, except Type 309 quoted 51.00c M1

Dunkirk, N.Y., bars, wire A4

Duquesne, Pa., bars C3

Gary, Ind., sheets except Type 416 C3

Harrison, N. J., strip C18

Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501 10.50c, Type 502 11.50c R2

McKeesport, Pa., bars; sheets except Type 416, C3

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2

Middletown, O., sheets and strip, except Types 501 and 502 and except 309 strip quoted 51.00c A10

Midland, sheets & strip C18

Munhall, Pa., bars C3

Pittsburgh, sheets C18

Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4

So. Chicago, Ind., bars & structurals C3

Syracuse, N. Y., bars, wire & structurals C18

Titusville, Pa., bars U4

Wallingford, Conn., strip W2

Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3

Washington, Pa., Types 301 through 347 sheets & strip except 303 & 309; 316 sheets 58.00c strip 60.00c W4

Watervliet, N. Y., structurals & bars A4

Waukegan, bars & wire A7

West Leechburg, Pa., strip, except Type 309 quoted 51.00c A4

Youngstown, strip C8.

ELECTRODES

(Threaded, with nipples, unboxed. f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5¼	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	84,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Imported, net ton, duty paid, metallurgical grade, $39-$40.

REFRACTORIES

(Prices per 1000 brick, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hardfired, $135 at above points.

High-heat Duty: Salina, Pa. $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

LADLE BRICK

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W.Va.; Irondale, Wellsville, O.

Wire Cut: $53. Chester, New Cumberland, W. Va.; Wellsville, O.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-$31.00; single paper bags, $35.00-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 20.00

Toluol, one deg. .19.00-23.50

Industrial xylol .20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia .$45.00

Per pound, ovens

Phenol, 40 (cariots, returnable drums) 13.25

Do., less than carlots .14.00

Do., tank cars 12.50

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

EASTERN LOCAL ORE

Cents, unit, del. E. Pa. Foundry and basic 56.62% concentrates, contract 16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:

Spot	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	19.50

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty pd. *$20-$22*

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. U.S. ports; prices on lower grades adjusted to Mn content and impurities.

CHROME ORE

Gross ton f.o.b. cars, new York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	*$35.00*
48% 3:1	*37.50*
48% no ratio	*28.50-29.00*

South African Transvaal

44% no ratio	*$19.00-20.00*
45% no ratio	*19.50-21.00*
48% no ratio	*27.00-28.00*
50% no ratio	*28.50-29.00*

Brazilian

44% 2.5:1 lump	*$32.00*

Rhodesian

45% no ratio	*$20.00-21.00*
48% no ratio	*28.00-29.00*
48% 3:1 lump	*37.50*
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide conc., lb, Mo, cont. Mines $0.90

METALLURGICAL COKE

Price per Net Ton

BEEHIVE OVENS

Connellsvll, fur.	$13.00-13.50
Connellsvll, fdry.	15.50-16.00
New River, foundry	18.00
Wise county, foundry	15.35
Wise county, furnace	14.60

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.00
Everett, Mass., ovens	
New England, del.‡	22.70
Chicago, ovens	20.00
Chicago, del.	†21.45
Detroit, del.	23.91
Terre Haute, ovens	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens	19.85
Chicago, del.	23.32
Cincinnati, del.	22.77
Detroit, del.	23.75
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.02
Cleveland, del.	22.62
Erie, del.	21.04
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del.	22.95
Flint, del.	23.00
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡Or within $4.03 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
Phila. (c'try) ..	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)..	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse).	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse) .	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
Chicago (city) .	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee (city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
Milwau. (c'try).	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[5]	5.08	5.28	6.73
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse) .	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
L. A. (w'hse)..	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
San Francisco..	6.15[10]	7.50[3]	7.80	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma.	6.70[7]‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

LEADING FERROALLOY PRODUCTS

Manganese Alloys

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload. 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

(Please turn to page 144)

Metal Markets Remain Unsettled

Lead drops ½-cent and antimony 6½ cents a pound as large offerings of foreign metal depress markets. Straits spot available at ⅛-cent under RFC's selling price

New York—Nonferrous metal markets remain unsettled. Readjustments are still being made to meet increased foreign competition arising from devaluation of several currencies abroad. Trading in tin and zinc has been disrupted by the steel strike which has eliminated the principal user of each metal. The general price trend is still downward, latest price reductions having been posted in lead and antimony. Straits tin is now readily available for prompt delivery at 95.87½c, New York, or ⅛-cent under the RFC asking price.

Lead—Prices dropped ½-cent a pound further last week to the basis of 13.55c, St. Louis. This represents a drop of 1⅜ cents a pound since Sept. 26 when the downtrend started. The latest price cut was necessary to stimulate buying so that bookings by custom smelters would balance their intake of ores, concentrates and scrap. Another factor is the increased tonnage of Mexican lead being offered here following devaluation of the pound sterling.

Effective Oct. 7, producers of lead sheet, pipe and oxides reduced their prices ½-cent a pound, while producers of pigments lowered prices ¼-cent a pound on dry white lead and sublimed white lead and blue. Phelps Dodge Copper Products Corp. has established its lead factor for paper cable price schedule at minus 3.75.

Antimony—National Lead Co. reduced antimony prices 6.50 cents a pound, effective as of Oct. 7, to the basis of 32.00c a pound in bulk quantities at Laredo, Tex. The former price had been 38.50c a pound since Oct. 8, 1948, when the price was advanced 3.50 cents a pound.

Reduction in the antimony price is attributed to the heavy flow of foreign metal to this country at reduced prices. The metal has been coming from China, Belgium and England and is being offered to American users at prices ranging from 28.00c to 32.00c a pound.

Zinc—Slab zinc prices are steady on the basis of 9.25c, East St. Louis, for prime western. This level, established Oct. 3, is lowest since November, 1946, when OPA controls expired.

Deliveries of slab zinc to domestic consumers dropped to 60,220 tons in September from 68,659 in August, making the nine months' total 482,476 tons against 574,438 in like period a year ago. Exports and drawback increased to 3830 tons from 1212, while shipments on government account rose to 6027 tons from 4468. This brought total shipments of slab zinc to 70,077 tons in September compared with 74,339 in August.

Production declined to 70,392 tons last month from 73,819 in August, making the nine months' total 669,356 tons against 631,498 in the like 1948 period. Stocks of slab zinc at the end of September amounted to 85,203 tons compared with 84,888 at end of August. Unfilled orders on producers' books at end of last month amounted to only 35,009 tons against 41,336 at end of August and 87,898 at end of February, high for the year.

Tin—Sufficient quantity of Straits tin is offered on the outside market for prompt delivery to establish the going level at 95.87½c, New York, ⅛-cent below Reconstruction Finance Corp's selling price. Private firms are booking practically all the business being done in tin, although the government agency is still making deliveries on old contracts. RFC will continue to cover needs of buyers unable to obtain tonnages on the outside market.

Pending resumption of free trading on the London Metal Exchange or settlement of the steel strike, consumers are expected to make only small, scattered commitments.

Copper—In contrast to activity in other major nonferrous metal markets, a substantial tonnage of copper is being booked for November, earliest delivery available. Buying is stimulated by desire of consumers to accumulate reserves as protection against a possible spread of strikes at refineries. Consumers are having difficulty in obtaining certain shapes, supply being sharply reduced by the strike at the Carteret, N. J., refinery. Undertone of the market is firm at 17.62½c, delivered Connecticut, for electrolytic.

Deliveries of copper to domestic users increased to 103,115 tons from 90,739 tons in August and were the largest since last March. Crude copper production from primary sources held steady at 56,946 tons compared with 56,232 tons in the preceding month, while output from secondary sources increased to 7291 tons from 6337 tons in August. Production of refined copper declined about 5600 tons to 79,949 tons from 85,577 tons in August. In addition to the large domestic deliveries, 21,101 tons of copper were delivered into the government stockpile. Stocks of refined copper at the end of September amounted to 193,890 tons, a drop of 23,277 tons from the 217,167 tons reported at the end of August.

Aluminum—Permanente Metals Corp. reports that commercial sales of aluminum rose 60 per cent in September compared with the average for the previous three months. Henry J. Kaiser, president, said the rising demand for aluminum indicates an industrial and business upturn in view of the thousands of uses of the metal in manufacturing and in the construction, transportation and electric power industries. Beginning in April and continuing to August, sales of aluminum declined substantially. Manufacturers who had maintained sizable inventories abruptly curtailed purchases below their requirements at that time. Permanente reduced production to less than 50 per cent of capacity in June, July and August compared with 100 per cent capacity operations in the like 1948 period.

Total primary aluminum production in the United States amounted to 54,184 tons in June, a decline of 5 per cent from May, says the Bureau of Mines. Output for the first six months totaled 323,126 tons, an increase of more than 6 per cent over the 303,624 tons produced in the like 1948 period. Shipments of primary aluminum from reduction plants declined to 30,711 tons in June, the lowest in more than two years, and resulted in stocks rising to the highest level since September, 1947.

Aluminum Shipments Increase

New York—Shipments of aluminum sheet, plate and strip increased in August for the first time in six months. This forms a basis for a more optimistic outlook in the aluminum industry, says Donald M. White, secretary, Aluminum Association, this city.

Shipments of these products totaled 47,892,491 pounds in August compared with 41,711,932 pounds in July, an increase of nearly 14 per cent. Production of primary aluminum totaled 104,009,815 pounds during August compared to 111,553,030 pounds the previous month.

"Preliminary estimates of shipments for September indicate a continuing upswing," Mr. White says. "Although we do not know how far we can project gains into the future, orders in this month are expected to show a decided improvement over last month."

Canadian Lead Price Declines

Montreal—Consolidated Mining & Smelting Co. of Canada Ltd. reduced its lead price ½-cent a pound to 15.00c. This is the third cut since Canadian lead prices were boosted about 10 per cent following devaluation of the Canadian dollar and represents a net decline of 1.50 cents.

To Review ICC Switching Order

Washington—Supreme Court will review a lower court decision throwing out an Interstate Commerce Commission order that two western railroads stop giving certain switching services to two large smelting firms.

ICC had ordered Denver & Rio Grande Western Railroad and Union Pacific Railroad to stop giving these services at American Smelting & Refining Co.'s plant at Leadville, Colo., and Garfield and Murray, Utah, and at United States Smelting, Refining & Mining Co.'s plant at Midvale, Utah.

This is one of a long series of cases in which ICC has tried to keep railroads from performing certain switching and car spotting services for large customers.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 17.62½c, Conn. Valley, Lake, 17.75c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 15.50-16.50c; 88-10-2 (No. 215) 24.50c; 80-10-10 (No. 305) 21.00c; No. 1 yellow (No. 405) 13.25-14.25c.

Zinc: Prime western 9.25c, brass special 9.50c, intermediate 9.75c, East St. Louis; high grade 10.25c, delivered.

Lead: Common 14.05c; chemical 14.15c; corroding 14.15c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 15.25-15.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25c; grade 2, 16.25c; grade 3, 15.25c; grade 4, 14.25c. Prices include freight at carload rate up to 75 cents per 100 lb.

5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Straits and other Grade A tin, spot, 95.87½c, New York; Straits, October, 95.25-95.75c; Straits, November, 95.00c. Chinese, 99% tin, October, 87.00-88.00c. RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 96.00c; Grade B, 99.8% or higher, not meeting specs. for Grade A, with 0.05% max. arsenic, 95.80c; Grade C, 99.65-99.79%, incl., 95.40c; Grade D, 99.5-99.649%, 95.40c; Grade E, 99-99.499%, 95.00c; Grade F, 98-98.999%, 94.50c; Grade G, 95-97.999%, 92.00c. Prices for Grade D through Grade G are for tin content.

Antimony: American 99-99.8% and over but not meeting specifications below, 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99% (Chinese, English, Belgian), prompt, 26.25c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $73-$75 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 73.25c per ounce.

Platinum: $69-$72 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 16-cent copper.)

Sheet: Copper 31.30; yellow brass 28.19; commercial bronze, 95%, 31.28; 90%, 30.84; red brass, 85%, 29.89; 80%, 29.47; best quality, 29.01; nickel silver, 18%, 41.78; phosphor-bronze, grade A, 5%, 50.47.

Rods: Copper, hot rolled 27.15; cold drawn 28.40; yellow brass free cutting, 22.76; commercial bronze, 95% 30.97; 90% 30.53; red brass 85% 29.58; 80% 29.16.

Seamless Tubing: Copper 31.34, yellow brass 31.20; commercial bronze 90% 33.50; red brass 85% 32.80; 80% 32.38.

Wire: Yellow brass 28.48; commercial bronze, 95% 31.57; 90% 31.13; red brass, 85% 30.18; 80% 29.76; best quality brass 29.30.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.42½, l.c.l. 23.05, c.l. 22.55; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.693, l.c.l. 25.443, c.l. 24.943; magnet, delivered, c.l. 27.62½, 15,000 lb or more 27.87½, l.c.l. 28.37½.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) **Sheets:** Full rolls, 140 sq ft or more, $18.75 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. **Pipe:** Full coils, $18.75 per cwt. **Traps and bends:** List price plus 48%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 27.96c; oval 27.46c; cast 25.99c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 2090 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 40.50c, f.o.b. Cleveland; 39.25c, Detroit; 39.25c, Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 88.00c; 100 lb kegs, 89.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	14.62½	14.62½	13.87½
Yellow brass	12.00	11.75	11.00
Commercial Bronze			
95%	13.62½	13.37½	12.87½
90%	13.50	13.25	12.75
Red brass			
85%	13.25	13.00	13.12½
80%	13.00	12.75	12.25
Best Quality (71-80%)	12.87½	12.62½	12.12½
Muntz Metal	11.12½	10.87½	10.37½
Nickel, silver, 10%	14.00	13.75	7.00
Phos. bronze, A	16.37½	16.12½	15.12½
Naval brass	11.62½	11.37½	10.87½
Manganese bronze	11.62½	11.37½	10.75

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.75; No. 2 copper 12.75; light copper 11.75; composition red brass 10.75, radiators 8.75; heavy yellow brass 8.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.75; No. 2 copper 12.75; light copper 11.75; refinery brass (60% copper) per dry copper content nom.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 11.75-12.00; No. 2 10.75-11.00; light copper 9.75-10.00, No. 1 composition red brass 9.00-9.25, No. 1 composition turnings 8.50-8.75, mixed brass turnings 5.50-5.75; new brass clippings 10.00-10.50, No. 1 brass rod turnings 7.75-8.00; light brass 5.50-5.75; heavy yellow brass 6.00-6.25; new brass rod ends 7.75-8.00; auto radiators, unsweated 7.50-7.75; cocks and faucets, 7.25-7.50; brass pipe 8.00-8.25.

Lead: Heavy 9.75-10.00, battery plates 4.00-4.50, linotype and stereotype 10.75-11.00, electrotype 9.50-9.75, mixed babbitt 9.75-10.00.

Zinc: Old zinc 3.50-4.00, new die cast scrap 3.25-3.75, old die cast scrap 2.50.

Tin: No. 1 pewter 48.00-50.00, block tin pipe 70.00-72.00, No. 1 babbitt 36.00-38.00.

Aluminum: Clippings 2S 10.00-10.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.00-3.50.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 10-13	17.625	13.55	9.25	95.875	17.00	32.00	40.00	73.25
Oct. 7-8	17.625	13.60	9.25	95.875	17.00	32.00	40.00	73.25
Oct. 4-6	17.625	14.05	9.25	96.00	17.00	38.50	40.00	73.25
Oct. 3	17.625	14.10	9.25	96.00	17.00	38.50	40.00	73.25
Oct. 1	17.625	14.55	10.00	96.00	17.00	38.50	40.00	73.25
Sept. Avg.	17.625	14.853	10.058	101.654	17.00	38.500	40.000	73.202
Aug. Avg.	17.625	14.806	10.000	103.00	17.000	38.500	40.000	71.889
July Avg.	17.279	13.335	9.346	103.000	17.000	38.500	40.000	71.500

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

STEELMAKING SCRAP COMPOSITE

Oct. 13	$26.75
Oct. 6	27.25
Sept. 1949	26.07
Oct. 1948	43.25
Oct. 1944	16.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	$29.50-30.00
No. 2 Heavy Melt.	27.50-28.00
No. 1 Busheling	29.50-30.00
No. 1 Bundles	29.50-30.00
No. 2 Bundles	23.00-24.00
No. 3 Bundles	22.00-23.00
Heavy Turnings	22.50-23.50
Machine Shop Turnings	20.00†
Mixed Borings, Turnings	20.00†
Short Shovel Turnings	22.00
Cast Iron Borings	21.00*
Low Phos. Steel	31.00-32.00*

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	31.00-32.00*
Heavy Breakable Cast	28.00-29.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-32.50
Axles	36.00-37.00
Rails, Random Length	35.00-36.00
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	33.00-34.00

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$26.50†
No. 2 Heavy Melt. Steel	25.50†
No. 1 Busheling	26.50†
No. 1 Bundles	26.50†
No. 2 Bundles	23.50†
Machine Shop Turnings	17.00†
Mixed Borings, Turnings	19.00†
Short Shovel Turnings	19.00†
Cast Iron Borings	19.00†
Bar Crops and Plate	27.50†
Punchings & Plate Scrap	27.50†
Cut Structurals	29.50†

† Nominal.

Cast Iron Grades†

No. 1 Cupola	40.00-41.00
Charging Box Cast	34.00-35.00
Stove Plate	35.00-36.00
Heavy Breakable Cast	32.00-33.00
Unstripped Motor Blocks	30.50-31.50
Malleable	34.00-35.00
Brake Shoes	31.00-32.00
Clean Auto Cast	42.00-43.00
No. 1 Wheels	35.00-36.00
Burnt Cast	32.00-33.00

† Nominal.

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00
R.R. Malleable	34.00-35.00
Rail, 3 ft and under	38.00-39.00
Rails, Random Lengths	32.00-33.00
Cast Steel	27.00-28.00
Railroad Specialties	31.00-32.00
Uncut Tires	30.50-31.00
Angles, Splice Bars	34.00-35.00

VALLEY

No. 1 Heavy Melt. Steel	$31.00-31.50
No. 2 Heavy Melt. Steel	30.00-30.50
No. 1 Bundles	31.00-31.50
No. 2 Bundles	27.00-27.50
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	22.00-23.00
Cast Iron Borings	22.00-23.00
Low Phos.	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	23.50
No. 1 Busheling	23.50
No. 1 Bundles	25.00
No. 2 Bundles	22.50
Machine Shop Turnings	17.00
Short Shovel Turnings	18.00
Mixed Borings, Turnings	16.00
Bar Crop and Plate	27.00
Punchings & Plate Scrap	27.00
Cut Structurals	26.00
Elec. Furnace Bundles	25.00-25.50
Heavy Turnings	25.00
No. 1 Chemical Borings	26.00

Cast Iron Grades

No. 1 Cupola Cast	32.50
No. 1 Machinery Cast	36.00-37.00*
Charging Box Cast	33.00-34.00
Heavy Breakable Cast	33.00-34.00
Unstripped Motor Blocks	29.00-30.00
Clean Auto Cast	36.00-37.00*
No. 1 Wheels	35.00-36.00*
Malleable	36.00-37.00*

* Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	26.00
No. 1 Bundles	26.00
No. 2 Bundles	20.00
Machine Shop Turnings	12.00
Short Shovel Turnings	15.00
Mixed Borings, Turnings	15.00
Cast Iron Borings	15.00

Cast Iron Grades

No. 1 Cupola Cast	41.00
Charging Box Cast	31.00
Heavy Breakable Cast	34.00
Stove Plate	30.00
Unstripped Motor Blocks	20.00
Brake Shoes	22.00
Clean Auto Cast	38.50
Drop Broken Cast	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	27.00
R.R. Malleable	33.00
Rails, Rerolling	37.00
Rails, Random Lengths	35.00
Rails, 18 in. and under	44.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$17.00-18.00
No. 1 Bundles	20.00-21.00
No. 2 Bundles	17.00-18.00
No. 1 Busheling	20.00-21.00
Machine Shop Turnings	12.00-13.00
Mixed Borings, Turnings	12.00-13.00
Short Shovel Turnings	14.00-15.00
Cast Iron Borings	14.00-15.00
Punchings & Plate Scrap	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-33.00
Heavy Breakable Cast	28.00-29.00
Clean Auto Cast	32.00-33.00

BUFFALO

No. 1 Heavy Melt. Steel	$28.00-28.50
No. 2 Heavy Melt. Steel	25.50-26.00
No. 1 Bushelings	25.50-26.00
No. 1 Bundles	27.50-28.00
No. 2 Bundles	24.00-24.50
Machine Shop Turnings	19.00-19.50
Mixed Borings, Turnings	20.00-20.50
Cast Iron Borings	20.00-20.50
Short Shovelings	21.50-22.00
Low Phos.	29.50-30.00

Cast Iron Grades

No. 1 Cupola	38.00-38.50
No. 1 Machinery	39.00-39.50
Mixed Yard	36.50-37.00
Malleable	35.50-36.00

Railroad Scrap

Rails, 3 ft. and under	36.00-37.00
Scrap rails	31.00-32.00
Specialties	32.00-33.00
No. 1 car wheels	33.00-34.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	15.00-16.00
No. 1 Bundles	18.00-18.50
No. 2 Bundles	14.00-15.00
No. 3 Bundles	nominal
Machine Shop Turnings	10.00-11.00
Mixed Borings, Turnings	10.00-11.00
Short Shovel Turnings	11.00-12.00
Punchings & Plate Scrap	22.00-23.00
Cut Structurals	22.00-23.00
Elec. Furnace Bundles	21.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-31.00
No. 1 Machinery	32.00
Charging Box Cast	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	26.00
Malleable	27.00-28.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$17.50-18.00
No. 2 Heavy Melt. Steel	16.00-17.00
No. 1 Bundles	17.00-18.00
No. 1 Busheling	14.00-15.00
Machine Shop Turnings	12.50-13.00
Mixed Borings, Turnings	10.00-11.00
Short Shovel Turnings	14.00-15.00
Bar Crops and Plate	19.00-20.00
Punchings & Plate Scrap	19.00-20.00
Chemical Borings	17.00-18.00

Cast Iron Grade

No. 1 Cupola Cast	30.00-31.00
Mixed Cast	27.00-28.00
Heavy Breakable Cast	18.00-20.00
Stove Plate	22.00-23.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	$25.00-26.00
No. 2 Heavy Melt. Steel	23.00-24.00
No. 1 Bundles	25.00-26.00
No. 2 Bundles	22.00-23.00
No. 3 Bundles	16.00-17.00
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	18.00-19.00
Short Shovel Turnings	19.00-20.00
Cast Iron Borings	18.00-19.00
Bar Crops and Plate	29.00-31.00
Punchings	29.00-31.00
Elec. Furnace Bundles	25.00-26.00
Heavy Turnings	23.00-24.00
Cut Structurals	26.00-27.00

Cast Iron Grades

No. 1 Cupola Cast	41.00-42.00
Clean Auto Cast	41.00-42.00
No. 1 Wheels	33.00-34.00
Stove Plate	29.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	31.00-32.00
Malleable	34.50-35.50
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	34.50-35.50
Rails, 2 ft. and under	38.00-39.00
Rails, 18 in. and under	39.00-40.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	35.50-36.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$28.00-29.00
No. 2 Heavy Melt. Steel	25.00-26.00
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings	21.00-22.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-38.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast	32.00-33.00
Brake Shoes	30.00-31.00
Clean Auto Cast	40.00-42.00
Burnt Cast	30.00-31.00

Railroad Scrap

R.R. Malleable	31.00-32.00
Rails, Rerolling	38.00-39.00
Rails, Random Lengths	32.00-33.00
Rails, 3 ft. and under	36.00-38.00
Uncut Tires	28.00-29.00
Angles, Splice Bars	33.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.00
No. 2 Bundles	22.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	19.00
Cast Iron Borings	18.00
Bar Crops and Plate	30.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R. R. Malleable	nominal
Rails, Rerolling	35.50-36.50
Rails 3 ft. and under	25.00-26.00
Angles and Splice Bars	31.00-33.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	15.00
Nos. 1 & 2 Bundles	13.00

Cast Iron Grades

No. 1 Cupola Cast	23.00-25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Wheels	17.00
Rails, Random Lengths	17.00

SEATTLE

No. 1 Heavy Melt. Steel	$16.00
No. 2 Heavy Melt. Steel	16.00
No. 1 Bushelings	13.50
Nos. 1 & 2 Bundles	14.00
No. 3 Bundles	nom.
Machine Shop Turnings	11.00
Mixed Borings, Turnings	11.00
Punchings & Plate Scrap	22.00
Cut Structural	22.00
Elec. Furnace Bundles	23.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-27.50
Heavy Breakable Cast	17.00
Stove Plate	17.00
Unstripped Motor Blocks	17.00
Malleable	20.00
Brake Shoes	17.00-18.00
Clean Auto Cast	23.00
No. 1 Wheels	22.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Railroad Malleable	22.00
Rails, Random Lengths	17.00
Angles and Splice Bars	17.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	26.00

Cast Iron Grades

No. 1 Cupola Cast	$30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	25.00

HAMILTON, ONT.

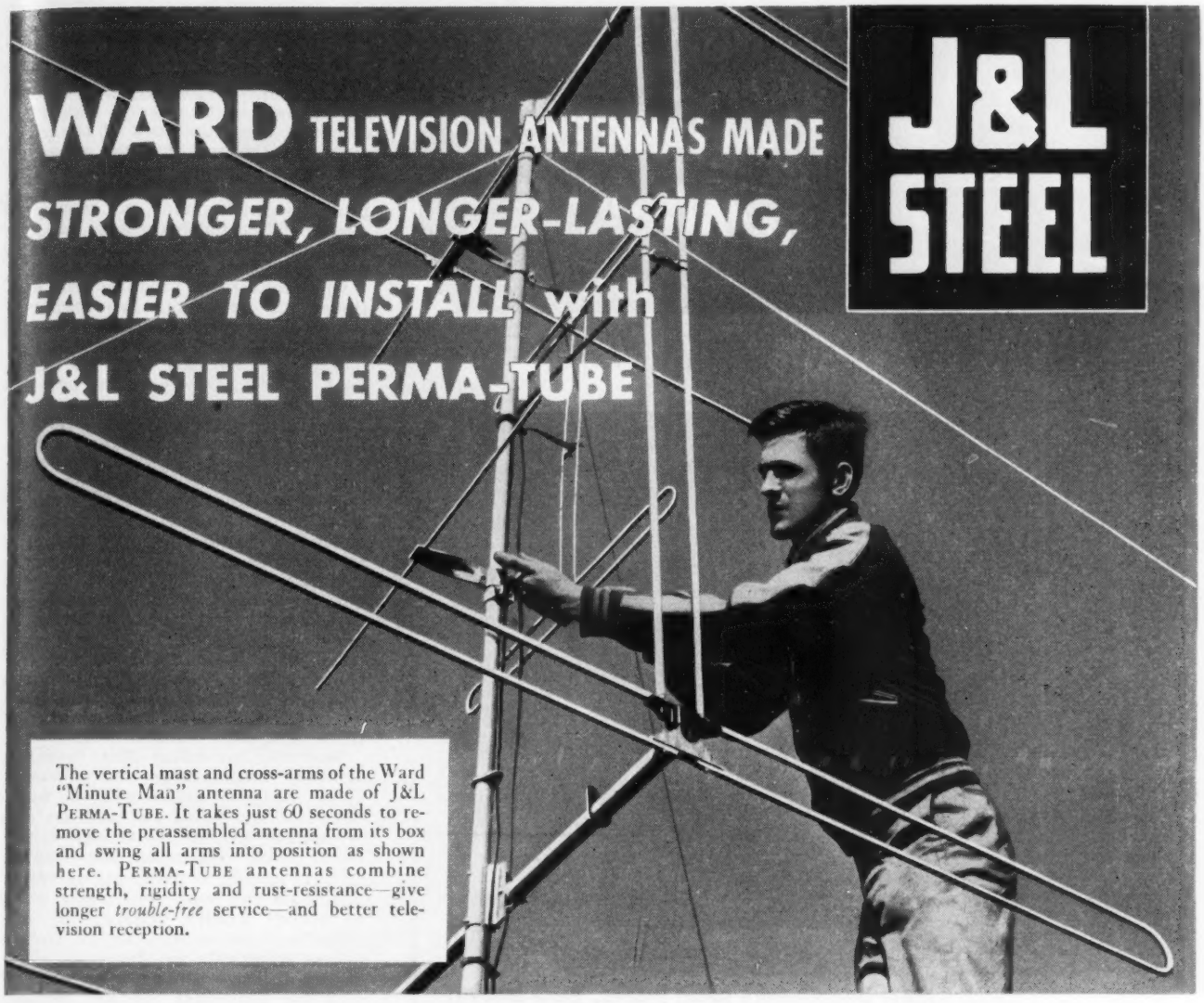
(Delivered prices)

Heavy Melt.	$20.00
No. 1 Bundles	20.00
Mechanical Bundles	18.00
Mixed Steel Scrap	16.00
Mixed Borings, Turnings	14.00
Rails, Remelting	20.00
Rails, Rerolling	23.00
Busheling	14.00
Bushelings new factory, prep'd	18.00
Bushelings new factory, unprep'd	13.00
Short Steel Turnings	14.00

Cast Iron Grades*

Cast	33.00-35.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.


WARD TELEVISION ANTENNAS MADE
STRONGER, LONGER-LASTING,
EASIER TO INSTALL with
J&L STEEL PERMA-TUBE
J&L STEEL
The vertical mast and cross-arms of the Ward "Minute Man" antenna are made of J&L PERMA-TUBE. It takes just 60 seconds to remove the preassembled antenna from its box and swing all arms into position as shown here. PERMA-TUBE antennas combine strength, rigidity and rust-resistance—give longer *trouble-free* service—and better television reception.

PERMA-TUBE may be used for many applications where strength, rigidity, rust-resistance, and attractive appearance are necessary.

By using the new exclusive rust-resisting J&L PERMA-TUBE for the vertical mast and cross-arms in the "Minute-Man" series of television antennas, Ward Products Corporation, Division of the Gabriel Company, Cleveland, Ohio, builds-in the following advantages:

1. **Greater structural rigidity with smooth, attractive appearance. Greater strength to resist ice loads.**
2. **Clearer, steadier, television reception. Less vibration from wind.**
3. **No mechanical seam in Perma-tube to invite rust which would reduce the torsional strength.**
4. **Ease and speed of installation . . . at less cost.**

J&L PERMA-TUBE is a light-wall, electricweld steel tubing, coated inside and out with an exclusive plastic-type, weather-resistant finish. PERMA-TUBE can be furnished: bent . . . expanded . . . flanged . . . swaged or fluted.

J&L PERMA-TUBE for television antennas, *costs less than any other tubing with comparable strength, rigidity and rust-resistance.*

J&L PERMA-TUBE is not only applicable to television antennas, but also wherever strength, rigidity and rust-resistance are important. It is available in all regular sizes and shapes of J&L Electricweld Tubing and in lengths up to 10 feet. Return the coupon TODAY for complete information on this new J&L product.

Jones & Laughlin Steel Corporation
404 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me complete information on the new J&L STEEL PERMA-TUBE mechanical tubing.

Do you recommend PERMA-TUBE for _____?

NAME _____

COMPANY _____

ADDRESS _____

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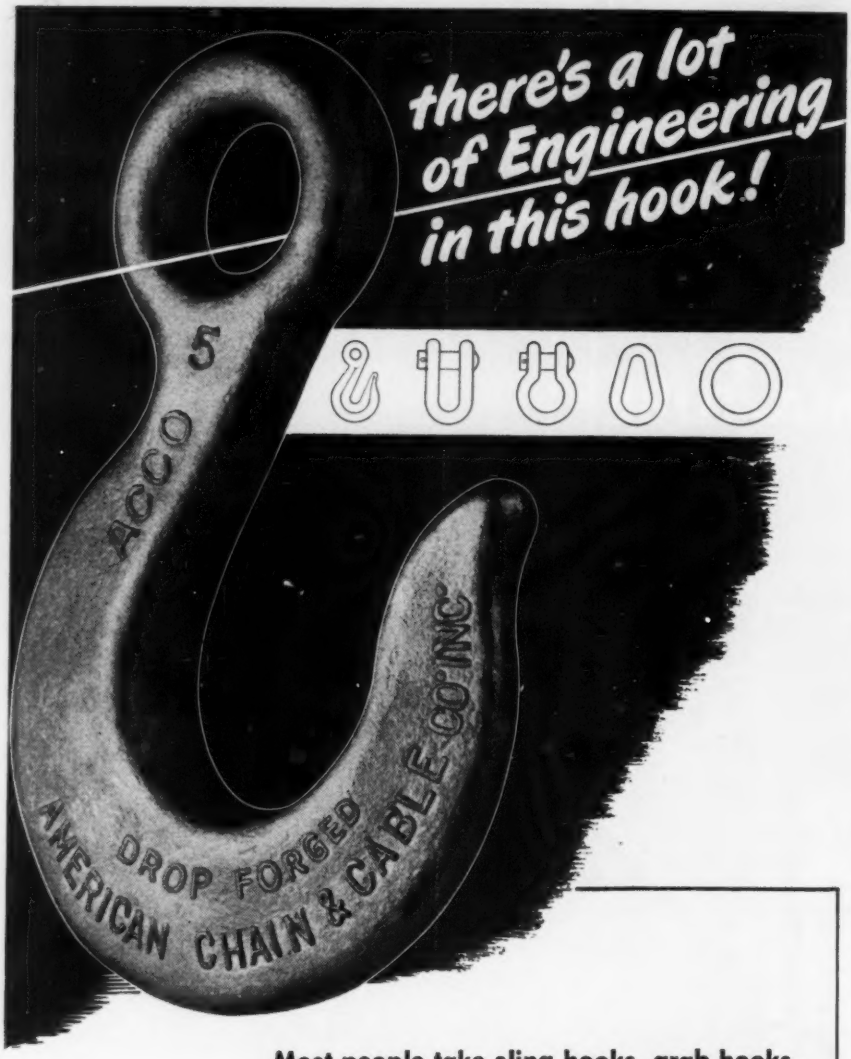
PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS



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Here at American Chain we take them seriously. Their design and manufacture call for a high type of engineering, plus years of experience.

The designers, metallurgists and other engineers responsible for the quality of American Chain products are proud of the results of their work. To them every American Chain fitting must be designed to do a job and do it well—made for safety as well as efficiency.

When you think of welded or weldless chain or chain fittings, think of AMERICAN—"*the Nation's chain maker.*" When you buy chain, buy AMERICAN, the *complete* chain line.

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AMERICAN CHAIN DIVISION
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TRADE MARK

In Business for Your Safety

Sheets Strip . . .

Sheet and Strip Prices, Pages 119-120-121

New York—While most sheet sellers are reluctant to accept orders for shipment after the turn of the year, some are booking that far ahead on tonnage for regular customers. Until the strike is settled no definite promises can be made, but most producers of cold-finished sheets and galvanized must book for next year's delivery if they are to book at all.

One midwestern producer who continues in operation has promised some cold-finished sheets for late November, provided buyers will accept a certain percentage of hot strip. Such an early delivery on cold-finished sheets is the exception.

Deliveries on hot-rolled sheets by mills still producing average around six to seven weeks, although shipping schedules would be more extended if they were not restricting sales to own customers. Consumers of sheets are turning more and more to warehouses. Users of sheet metal still have close to 30 days' supply, but stocks are becoming unbalanced. Some sizable purchases, involving as much as 200 tons, have been made from jobbers along the eastern seaboard, but many more of substantial size have been rejected, especially by distributors who are endeavoring to protect their regular customers.

Boston—Cold-rolled strip supply is in better volume than that of sheets. Most district nonintegrated mills' stocks of hot-rolled material are sufficient for five to six weeks' operations. Most consumers are drawing on inventories to maintain operating schedules and some will feel a pinch in carbon grades, notably in cold-rolled and galvanized, before Nov. 1 unless shipments are resumed. Producers still operating are under pressure for additional tonnage, but are holding to original orders. Galvanized products are in shortest supply of all flat-rolled grades. Much rescheduling with extensions in delivery dates will confront sheet mills when the strike ends. An upsurge in buying also is likely, as well as a possible broadening of the allocation policy.

Pittsburgh—Rapidly dwindling inventories of sheets and strip soon will be reflected in gradual curtailment of production schedules among metalworking companies. At start of strike most users had 4 to 6 weeks' inventory. However, unbalanced stock position in regard to vital components and efforts to maintain at least partial operations as long as possible likely will necessitate early tapering in manufacturing schedules. Electrical appliance concerns are rationing output to dealers so as to establish as equitable a distribution of their products as possible. Those mills still operating have been subjected to terrific pressure for deliveries. Some cold-rolled strip interests are still operating.

Philadelphia—Most mills are closed down, district sheet sellers report fairly active inquiry. Consumers are interested in obtaining positions on schedules so as to get early shipments once operations are resumed. Sellers generally are not accepting tonnage for shipment beyond the end of this year, except from regular trade and

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Many times over

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The mask of high grade, soft, pliable leather fits any face and head size. And it distributes the shock of impact over a wide area. Fitted with WILLSON Super-Tough* lenses, of course, for maximum eye protection.

For Dusty Jobs Style DL48

Indirectly ventilated with four baffled and screened ports in the eyecups. They permit the entrance of air—exclude dust, grit and other flying particles.

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Deep eyecups are well perforated to permit free air circulation to reduce fogging. Corduroy bound edges absorb perspiration. Well suited for use in the temperatures found in steel mills and foundries.

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"Established 1870"

*T. M. Reg. U. S. Pat. Off.

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in certain instances are not even doing that. One district producer of hot sheets, whose operations have not been affected by the strike, has filled schedules for the fourth quarter and has withdrawn from the market. A Baltimore producer of stainless sheets is confronted with a shortage of slabs because of strike at the plant of its principal supplier.

Cincinnati—Armco Steel Corp. is under pressure for deliveries from plants still operating. First obligations to those with bookings at the corporation's strike-bound mills likely will eliminate any freed sheet tonnage. Little tonnage, except for specialties, has been accepted for first quarter.

St. Louis—Local sheetmakers, untouched by the steel strike, are being offered many new orders from eastern areas. A selected few are being accepted, but old customers are permitted to book their needs as far ahead as they desire. Rejects and second quality sheets are in big demand. Premium priced offers are not numerous, but occasional conversion offers are being made to back up pleas for acceptance of sheet orders. Pending settlement of the strike, Granite City Steel Co. has tentatively postponed until the second quarter its plan to shut down its tin plate line in January for improvements.

Los Angeles—Pressure for sheet deliveries is increasing, with consumers becoming more concerned over effect of an extended shutdown. Several thousand tons of prestrike shipments are enroute to jobbers and fabricators, but warehousemen estimate sheet stocks will be exhausted in a few weeks. No major customer, however, has found it necessary so far to suspend for lack of material. Some gray market operations are reported. Warehouses generally are allocating sheets, while Kaiser Steel Corp. has placed most flat-rolled items on a semiallocation basis.

San Francisco—Steel strike will hit users of galvanized sheets particularly hard. Supplies were low when the walkout began and they may be used up by mid-October; at least by the end of the month. By the third week of October, the shortage of all grades of sheets will begin to pinch and most of the supply will evaporate early in November.

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• Blast Furnace Stove Checker
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Structural Shapes . . .

Structural Shape Prices, Page 119

Pittsburgh—Expansion programs among major industries, such as electric utilities, will be set back as a result of the steel strike. A number of structural fabricators' plants are idle, while those still operating have less than two weeks' supply of steel on hand. Fabricators were unable to augment steel inventories prior to the strike because of the inability to determine beforehand exact size specifications required for future work.

New York — District fabricating shops continue in operation, but stocks are becoming unbalanced in certain instances. Should the steel strike continue for a few weeks, many will be forced to suspend for lack of steel. Some shops with CIO contracts are confronted with possible strikes. Structural inquiry is less active, due to uncertainties created by the steel strike and to seasonal influences.

Boston—Bulk of structural tonnage being estimated is for public works, notably bridges. More than 5000 tons will be required for 42 bridges, overpasses and grade eliminations for a highway between Newton and Wakefield, Mass. District shops are buying little fill-in tonnage from warehouses, but a New York state shop is seeking 200 tons to complete a bridge.

Philadelphia—While new inquiry is tapering, a fair sprinkling of structural orders has been placed, including some private as well as public work. Only one district fabricating shop is down so far; others indicate they will be forced to curtail because of unbalanced inventories in the near future unless the labor controversy in steel is settled.

San Francisco—Because of the low level of demand in recent months, inventories of most structural items were in good shape at the start of the steel strike. Wide flanged beams were an exception, supplies of which are expected to last until Nov. 1.

Seattle—Fabricating plants report slow business, although a fair tonnage of structurals is involved in small jobs for schools and industrial construction.

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NEW ALTITUDE MARKS IN SALES: Next time you board a commercial airliner . . . or *any* plane, for that matter . . . look around you and see what the aviation industry thinks of American Phillips Screws. *They use almost nothing else but!* And aside from the assembly savings and the vibration-proof fastenings, there's another customer-consideration in there, also . . . because there's never a burr on a Phillips head to snag clothes or scratch hands. Buyers of everything from airplanes to zithers, what's more, are coming to recognize *and look for* the American Phillips crossed recess as a sure surface index of inbuilt quality in *any* product. Does *yours* have this sales advantage? Just write:

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4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

AMERICAN PHILLIPS *Screws*

ALL TYPES

ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

Plates . . .

Plate Prices, Page 119

New York—With only two eastern plate mills in operation, supply has been reduced to a level well below demand. Buying of plates for a considerable time had been sluggish, with most producers up to the time of the strike able to make deliveries within three to four weeks or less. The two eastern producers in operation have little to promise under five weeks and could extend their positions further if they were not disposed to confine commitments to regular customers.

Central Iron & Steel Co., Harrisburg, Pa., division of the Barium Steel Corp., has agreed to the terms of the union in setting up pension and insurance benefits on a completely management-financed basis. In meeting advanced costs, the company has increased prices on plain carbon plates $5 a ton. Its new price is now 3.75c, mill. No change was made in the company's price on floor plate.

Philadelphia—Plate demand is in excess of the supply available from the two eastern mills in operation. Backlogs at these plants are increasing with delivery promises extended to around five weeks.

Some cancellations have been made by consumers who find they cannot go ahead with schedules because of shortages in other lines.

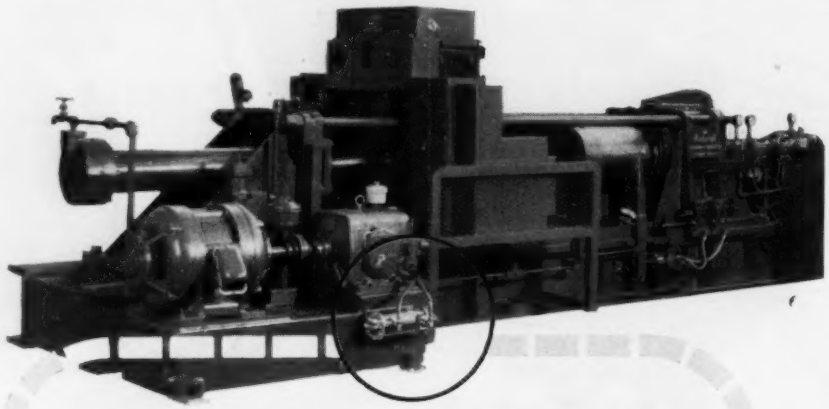
Sun Shipbuilding & Dry Dock Co., Chester, Pa., noted in the Oct. 3 issue as being low on two combination passenger and truck-trailer vessels for west coast operation, is low on a bid to build 10 additional ships of such type. Each ship will require 8500 tons of steel, principally plates.

Ingalls Shipbuilding Corp., Pascagoula, Miss., has been awarded the construction of a single screw ship with turbine propulsion to serve as an experiment in the possible replacing of the Liberty type cargo vessel of World War II in the event of an emergency. Contract calls for payment of $4,744,000 to cover construction and an additional $790,000 for engineering work and design. Maritime commission opened bids Aug. 15.

Boston—Delay in delivery of plates required for specific projects looms. A substantial tonnage needed for a 48-in. water line carries specifications for deliveries starting in November which appears doubtful of fulfillment. Tank shops will need tonnage by next month, although inventories about matched order backlogs Oct. 1. Shops have difficulty in acquiring material for fabrication to cover orders taken since that time. Stocks of floor plate held by warehouses appear ample for near future needs.

San Francisco—Continued operation of Kaiser's Fontana mill plus fairly substantial inventories of light plates tend to temper worry in the immediate future on part of consumers. Should the strike last more than two months, shortages probably would occur.

Seattle—Demand for plates is slow, although several sizable jobs are pending. The smaller shops are operating only part time and report prospects not promising for the immediate future.



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Offers Free Machining Steel

Chicago—Joseph T. Ryerson & Son Inc. are again marketing a leaded, free machining steel sold under the manufacturer's copyrighted trade name of Ledloy. Leaded steels were first manufactured by Inland Steel Co. prior to World War II. During the war and in the postwar period, production of leaded steels was curtailed and was resumed only recently.

Reinforcing Bars . . .

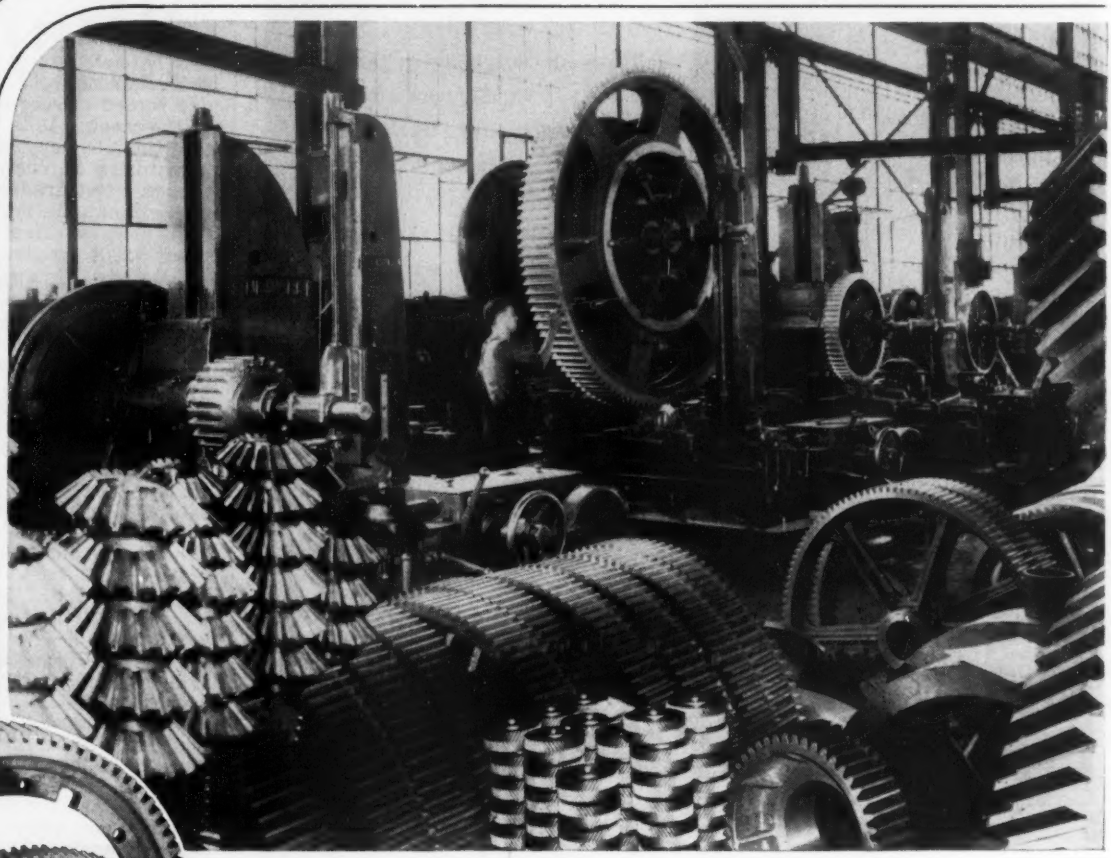
Reinforcing Bar Prices, Page 119

San Francisco—Supplies of reinforcing bars are sufficient to carry most users for about two months. If the steel strike is prolonged, pressure will mount.

Tin Plate . . .

Tin Plate Prices, Page 120

San Francisco—Completion of most of California's heavy summer fruit and vegetable packing schedules by the time the steel strike started indicates no distress is likely. Agreement between American Can Co. and the union also will help relieve any prospect of shortages arising in plants which put up foods on a year-around basis.



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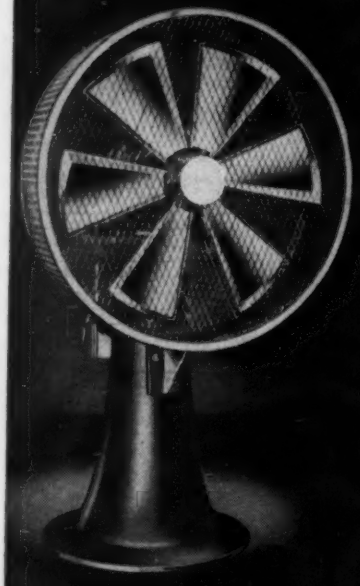

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Steel Bars . . .

Bar Prices, Page 119

Pittsburgh—All cold-finished bar producers in this district are idle, either because of strike at plants or lack of hot-rolled steel. Columbia Steel & Shafting Co. was the latest to shut down its mill. This interest had extended its contract on an indefinite basis Oct. 11, but steel shortage forced closing of this plant later in the week. It is difficult to ascertain the adequacy of cold-finished bar inventories in customers' hands, although most trade observers believe these stocks are not sufficient to sustain metalworking operations more than 3 to 4 weeks.

New York—Although most bar mills are down because of strike, they are still willing to book orders for shipment as early as possible after production has been resumed. Orders are entered for production in the order they are received. Much time can be lost by waiting until the strike is ended before placing orders, but consumers are inclined to move slowly, partly because of the uncertainty as to their own labor situation in some instances and also the unpredictable business outlook in general. About best delivery offered in hot-rolled carbon bars is six to seven weeks after resumption of mill operations.

Boston—Production of cold-finished carbon bars, restricted for several months, is still lower. Consumers' stocks generally are balanced and sufficient to cover needs for some weeks. Shops supplying parts for automobile assemblies, however, are drawing steadily from inventory, including some alloy.

Los Angeles—Despite loss of several days' production due to mechanical difficulties in its new bar mill at Niles, Calif., Pacific States Steel Corp. is back to capacity operation. The company has resumed shipment of bars, structurals, and merchant steel and is booking for late November and December delivery.

San Francisco—No widespread or serious distress in merchant bars expected until December. Supplies are adequate to carry most consumers until that date.

Seattle—Northwest Steel Rolling Mills Inc., this city, is operating at capacity, but the strike has completely closed Bethlehem's local plant.

Tubular Goods . . .

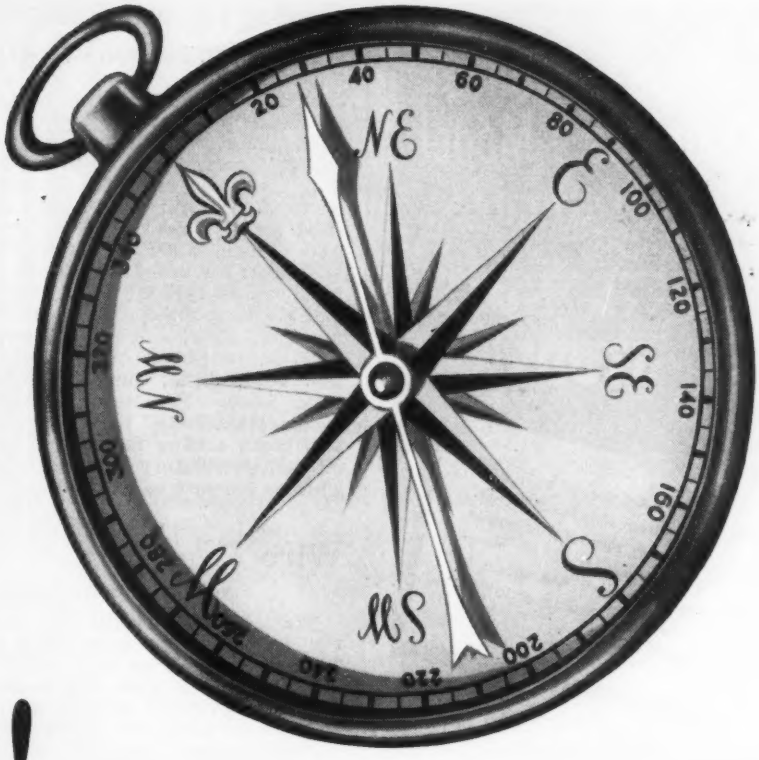
Tubular Goods Prices, Page 122

Los Angeles—Demand for pipe is up considerably since start of the steel strike, with pressure on suppliers stronger than in many months. Kaiser Steel Corp.'s pipe mill at Fontana is booked well into first quarter, 1950.

San Francisco—Supplies of cast iron and small steel pipe are sufficient for at least 30 days' needs. Beyond that some users will begin to be pinched. Pipe procurement will be eased by continued operation of Kaiser's facilities.

Seattle—Cast iron pipe agencies are marking time, as little new business is developing. Some orders are being filled out of stock, inventories now being fairly complete.

Go North, East, South *or* West... young man!



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"Go West, young man, and grow up with the country." Horace Greeley said it in 1854. He was right . . . but he was also wrong. He was wrong because *all* of America turned out to have room for development then undreamed of.

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Income: Since 1910 we have increased our annual income per household from an average of less than $2400 to about $4000 (in dollars of the same purchasing power), yet—

Work hours: Since 1910 we have cut work hours down an average of 18 per week—equivalent to more than two present work days.

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This is what we have done, and this is the way we have done it—to get higher wages, shorter hours, and lower-cost goods for everybody.

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Sure, our system still has faults . . . but none that we cannot cure if we all work together to do it.

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- Why the mainspring of our system is productivity
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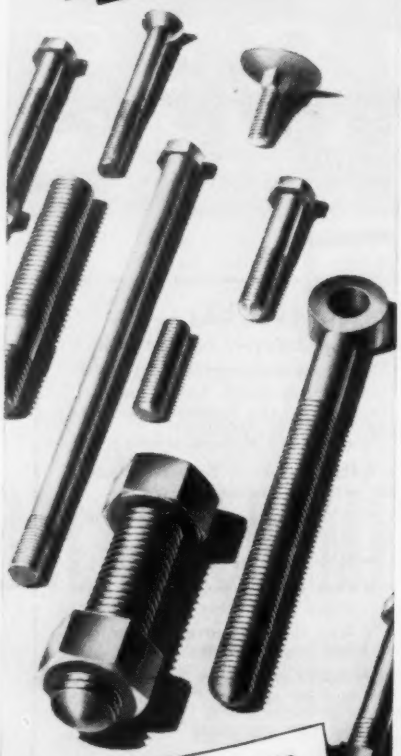

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Roebling Increases Prices

Trenton, N. J.—John A. Roebling's Sons Co. has increased prices ½-cent a pound, effective as of Oct. 4, on its strip and wire products. New prices, f.o.b. mill this city, are: Cold-rolled carbon steel strip, 5.00c for 3 in. and wider and 5.50c for over ½-in. to under 3 in.; cold-finished spring steel strip, annealed 6.30c for 0.40-0.60 carbon, 6.90c for 0.60-0.80 carbon, 8.85c for 0.80-1.05 carbon, 11.15c for 1.05-1.35 carbon; MB spring wire, high carbon, 6.35c; rope wire, 8.00c for mild plow, 8.30c for plow, and 8.70c for improved plow; cold-rolled flat wire, 5.80c; fine and weaving wire, 8.50c. The upward price revision is attributed to higher production costs arising from the granting of noncontributory pension and insurance benefits to employes.

Wire . . .

Wire Prices, Page 121

Fostoria, O.—Seneca Wire & Mfg. Co., this city, has raised mill prices ½-cent a pound on high-carbon MB spring wire to 6.05c, on cold-rolled flat wire to 5.50c and on rope wire to 8.00c for mild plow, 8.30c for plow, and 8.70c for improved plow.

Boston—Volume of finished wire production is substantial, despite inactivity of the largest district mill. One integrated and several nonintegrated mills are operating; their output is larger and more diversified than before the strike started. Inventory position of wire consumers varies; one plant in western Massachusetts has curtailed operations, due to lack of steel, and considerable upholstery spring wire on mill books has not been shipped. Screw manufacturers have steel for 30 to 45 days' needs. Razor blade steel inventories are substantial.

Washington—American Chain & Cable Co., Wilkes-Barre, Pa., has been awarded contract for 48 units of wire rope at $100,800 by Aviation Supply Office, Navy Department, Philadelphia.

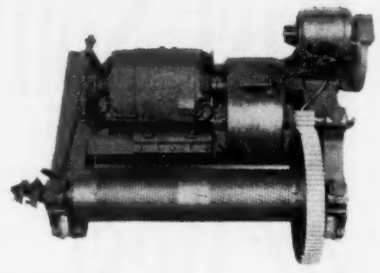
South Has Small Steel Stocks

Birmingham—Indications increase that additional wholesale layoffs in steel-dependent industries of the district cannot be postponed much longer than another 10 days to two weeks. Inquiry reveals varying degrees of inventories, but overall supplies are not sufficient for more than two weeks operations at current rate of consumption. Connors Steel Co., only producer operating in this district, is being hard pressed, especially for cotton ties with the season at its height. Considerable demand is being exerted also for concrete reinforcing bars from the same company.

Kaiser Expansion Progresses

Oakland, Calif.—Kaiser Steel Corp. is scheduled to place its new blast furnace in operation at its Fontana plant late in October. Work is proceeding on the company's new continuous hot strip mill at the same works, completion due about Jan. 1, 1950.

STOP
OIL SHOWERS
FROM CRANE MOTORS



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Why put up with this visible evidence of high lubrication and application costs? Besides, NON-FLUID OIL saves further time and money because its dripless qualities cut down stock cleaning costs.

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NON-FLUID OIL is not the name of a general class of lubricants but is a specific product of our manufacture.

Carboloy Cuts Standard Blanks

Detroit — Carboloy Co. Inc., this city, has reduced prices 10 per cent on all standard blanks in package quantities, effective Oct. 3. A new quantity discount of 5 per cent on individual orders for five to nine identical packages of standard tools and blanks in package quantities for immediate delivery has been initiated. This quantity discount applies to both stocked and nonstocked grades. On ten or more standard packages, the discount is 10 per cent off list price. In addition, nonstocked grades of standard tools and blanks in lots of 5 or more packages are available at the same price as the stocked grade items. The company's packaging program has been broadened to conform more closely to industry requirements. For example, certain standard blanks originally packaged in lots of 100 can be obtained in packages of 50 each.

Firth Sterling Revises Prices

McKeesport, Pa. — Firth Sterling Steel & Carbide Corp. announces price cuts averaging 10 per cent on tungsten carbide tips and blanks, effective Oct. 5. Firth Sterling also announces new package lot prices and additional discounts on package quantities of tips and carbide-tipped general purpose tools.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 122

Pittsburgh—Not all producers of fasteners have been affected by the steelworkers strike. Some tonnage cancellations have been received, tonnage that undoubtedly never will be recovered. Prior to Oct. 1, producers of nuts, bolts and rivets had experienced a moderate improvement in order volume, not all of which was attributed to protective buying by customers.

Refractories . . .

Refractories Prices, Page 122

Cincinnati—A new tunnel kiln is being built by the Allied Engineering Division, Ferro Enamel Corp., Cleveland, at the Taylor, Ky., plant of Chas. Taylor Sons Co., manufacturers of special refractories. Erection of the continuous kiln will increase production capacity and improve deliveries. It is scheduled to be completed Nov. 15, 1949.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 122

Chicago—Foundrymen are trying desperately to lay in coke. The shortened work-week and then the strike caught many in the process of working off what, in the light of then-prevailing business conditions, were oversupplies. A two-pronged pincers closed suddenly upon them: Less coke available; greater consumption as business picked up. Coke sellers are selling selectively. Distress pleas can still be acted upon but a real need must be shown. One principal supplier must allocate.

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This impressive span of successful enterprise, plus the helpful comments and suggestions from a long line of users, has taught us how to build cranes that emphasize accessibility, rigidity, long life, safety and economy. BEDFORD CRANES are built in any span or lift, 5 to 150 tons capacity, designed and engineered to meet your requirements.

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● Gerrard Round Steel Strapping is adaptable to almost every type of tying operation. Between the 18 gauge strapping for protecting parcel post packages and the 8 gauge strap for securing carload lots of steel pipe or machinery, there's a size of Gerrard Strapping that will do your job perfectly.

Because it's *round*, Gerrard Steel Strapping grips where it touches. It is ideal for pallets and has been used successfully to palletize such odd shaped objects as auto springs and rear axles. *And Gerrard Round Steel Strapping costs about 40% less than any type of metal reinforcement.*

Gerrard engineers will gladly consult with you about your strapping problems free of charge. Send for the *Blue Book of Packaging*. It is free. GERRARD STEEL STRAPPING COMPANY, 4745 So. Richmond Street, Chicago, Illinois.

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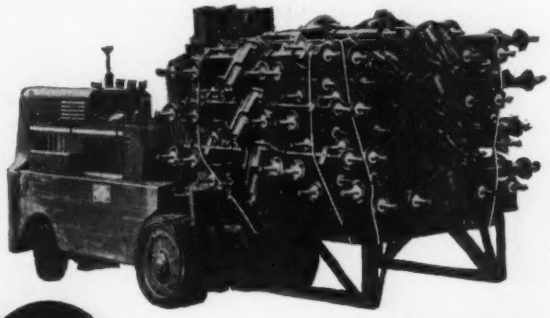

Gerrard Round Strapping grips where it touches, conforms to the odd shape of the auto axles on the pallet.

USS
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ROUND STEEL STRAPPING
UNITED STATES STEEL

Foreign Ore Prices Drop

New York—While principal foreign grades of iron ore and manganese ore are generally unchanged, devaluation is now beginning to affect tungsten and chrome ore prices which are off sharply. Wolframite and scheelite are down $6 a net ton unit to $20-$22, duty paid. Chrome is off generally from $1.50 to $7 depending upon grade.

Pig Iron . . .

Pig Iron Prices, Page 118

Pittsburgh—Foundries serving the plumbing and radiation industries are particularly concerned over the prospective shutdown of pig iron supply sources. While most of these interests have substantial inventories, they desire still larger ones to support the higher operating scchedules. Foundries serving railroad and coal mine car industries continue in the doldrums. Ingot mold manufacturers have been adversely affected by the steel strike. Jobbing foundries have ample pig iron inventories, but their order volume has receded sharply since Oct. 1. Pittsburgh Coke & Chemical Co.'s stack at Neville Island remains in operation.

New York—District foundries are fairly well supplied with pig iron and coke. However, they are still pressing for both, as they do not know how long the steel and coal strikes will continue. Three blast furnaces still are operating along the eastern seaboard. Pressure for iron has resulted in some modest buying of foundry grade from abroad—iron on which deliveries are expected within about three to four weeks.

Boston — Foundries are melting more iron, improvement centering largely among jobbing and smaller miscellaneous shops. Machine tool casting requirements are slow and melt by larger consumers in textile mill equipment industry continues restricted; one large shop in Rhode Island is adding an extra shift to its schedule. Bulk of orders is for prompt delivery; forward volume is slow. Most furnaces normally shipping to New England are down, but the Mystic furnace at Everett, Mass., continues operations and has a well balanced supply of foundry and malleable in reserve.

Buffalo—Shortage of coke is causing a sharp recession in foundry operations. Four of the leading melters in the area have slashed operations due to the coke scarcity.

Chicago—Three furnaces at Wisconsin Steel Co. and one at Interlake Iron Co. are producing iron in the district. Some iron is available also from outside the immediate area, if a consumer wants to pay the freight. As yet, there is no concerted drive to get more iron. It's useless if a foundry can't get enough coke or its customers can't put a finished casting into some otherwise incomplete end product. Foundry operations are not seriously affected by the steel-coal tieup.

Cincinnati—Foundry operations in this district vary widely, with the average about 50 per cent of capacity. Shipments of pig iron are being received and this tonnage, supplemented by melters' stocks, may outlast supplies of coke in case the strikes are prolonged.

Birmingham — Operations of the North Birmingham plant of U. S. Pipe & Foundry Co., have been reduced from a double shift to a single shift basis. General business conditions are responsible, the company announces.

St. Louis—Koppers' production at Granite City, Ill., continues at half rate. Officials are considering blowing in the second blast furnace to meet the increasing demand from strike-bound areas. Numerous orders from customers of northern and eastern furnaces are being received, and some are being filled from ground stocks. The No. 2 stack would probably be lighted immediately were it not for the coal and coke situation.

Scrap . . .

Scrap Prices, Page 125

Pittsburgh — Scrap continues to move to the three integrated producers operating in this district. At least one interest has placed small tonnage orders for open-hearth grades at quoted levels. Relatively little tonnage of local industrial scrap has accumulated during the first two weeks of the steel strike. In some instances, metalworking operations have been curtailed to conserve steel supplies. Other offsetting factors include substantial reduction in amount of scrap generated because of strikes among many metalworking companies here; while some large integrated mills are still accepting shipments of industrial scrap for stocking outside of plant premises. There is little activity in the market for turnings, although one small sale last week was at $22 for short shoveling. Recent railroad scrap list awards have been within the range of $32-$32.50 for No. 1 heavy melting steel, and $33-$34 for railroad specialties. Little of this tonnage came to Pittsburgh mills. No weakness in scrap quotations is anticipated unless the steel strike continues for another 3 to 4 weeks. Still higher scrap prices may develop if the mills re-enter the market simultaneously following termination of the strike.

Boston—Demand for steel scrap lags with prices for most part holding advances made over recent weeks. Cast grades are also slow, but show more life than steel scrap. Price pendulum has swung full arc in relation to pig iron and scrap. Late last year scrap went higher than pig iron; situation is reversed with foundry iron $50.50, furnace, and mixed cast around $28, delivered.

Philadelphia—Steel scrap prices are nominally unchanged, buyers and sellers marking time. No. 1 cupola cast is lower at $32.50, delivered, and No. 1 machinery cast and clean auto cast are off nominally to $36-$37. No. 1 cast wheels are nominally lower at $35-$36, reflecting lower offers by brokers. One district consumer of steel scrap has 200 cars of scrap and other raw materials on track which he is unable to unload because of the strike.

New York—Except for scattered orders for cast, the scrap market

is quiet. Brokers' buying prices for steel grades are nominally unchanged.

Chicago—Brokers who still hold substantial scrap orders from struck mills are running into considerable difficulty in obtaining material. Some of these orders are not dated and will be filled whenever the strike ends. Scrap is moving, however, quantities of No. 2 steel and cast iron borings being laid down adjacent to the plant of a major consumer. Limited tonnage also is going to operating mills. No. 2 heavy melting scrap involved in a sale this month is said to be inferior in quality, its price not being representative of the market. One broker is unable to buy No. 2 steel at $25.50, dealers being disposed to hang on to material in expectation of a price surge when strike ends.

Buffalo—Strength continues to pervade the scrap market despite absence of new business. Dealers covering prestrike sales also are paying in line with present quotations for yard material. Except for small tonnage of cast moving to foundries, shipments are nil.

Cleveland—With most of the steel industry strikebound, bulk of the demand for scrap is coming from foundries. The steel strike has not yet weakened the price structure.

Cincinnati—Scrap prices are steady despite mill shutdowns. Tonnage is moving steadily to Hamilton and Middletown mills and to foundries.

St. Louis—Mill buying of scrap for winter stockpiles has begun. Current quotations have improved country shipments and considerable tonnage is coming in from enbargoed areas. Brokers claim established price on No. 2 heavy melting is $25 to $26, but at least one consumer has bought as low as $23. There apparently is urgency behind scrap buying.

Los Angeles—Most of the scrap movement in this district is on a broker-dealer basis, with little mill buying except by the one major steel producer remaining in production.

Seattle—Since the largest buyer is out of the market because of the strike, little interest is being shown in scrap.

Warehouse . . .

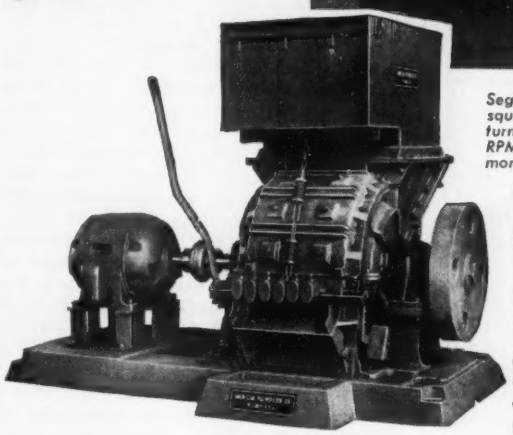
Warehouse Prices, Page 122

Pittsburgh — Unprecedented demand for steel from warehouse stocks has developed since Oct. 1. Survey of leading distributors not on strike in this district indicates average increase of nearly 100 per cent in shipments from stock to date this month compared with the like period in September. Edgar T. Ward's Pittsburgh warehouse closed Thursday, as did its parent company, Columbia Steel & Shafting Co. Columbia was forced to shut down despite an indefinite extension of its contract Oct. 11 because of lack of hot-rolled steel for cold finishing.

Philadelphia — Warehouse stocks are being doubly squeezed. Because of the mill tie-up, consumer demand is heavier and jobber stock replacements are almost impossible.

Boston—Demand for steel from warehouses is stronger, reflecting loss of tonnage from most mills. Buying of sheets is heaviest with dents appearing in inventories of galvan-

TOP SCRAP VALUE and TOP CUTTING-OIL RECOVERY



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Long, curly turnings of steel, alloys, brass, aluminum, etc. are rapidly reduced to easily-handled chips, requiring only a fraction of usual storage space and increasing cutting oil reclamation to 30 to 50 gallons per ton.

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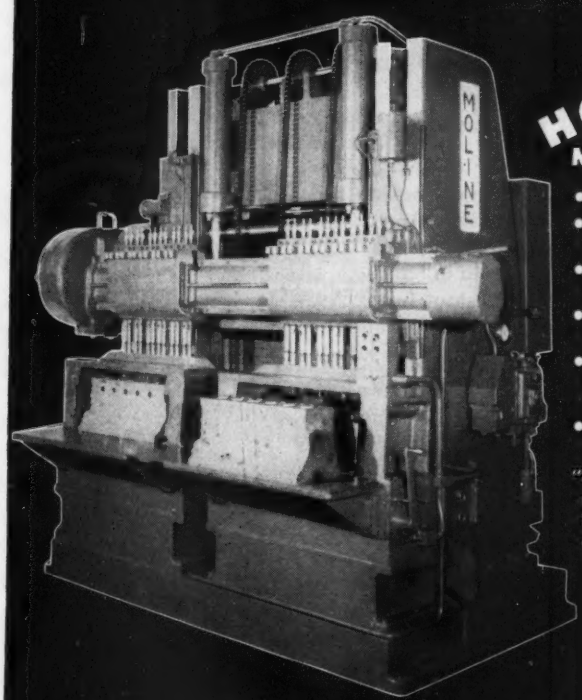

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ized and cold-rolled items. Lagging behind the trend are cold-finished bars with which most distributors are well stocked. Selling off inventory last quarter, one industrial user disposed of about 500 tons of cold-finished sheets to a warehouse. What is left of the tonnage has been repurchased by the first seller at a premium, or at the warehouse price.

Chicago—Call for warehouse steel is more orderly at present than it was at peak of the shortage. Reasons are: Remarkably few metalworking companies as yet are suffering ill effects from the strike; there is no widespread shortage encompassing all products; what is in short supply with one company may be ample with another; enough mills are operating to soften the pinch. Maladjusted inventories, however, will be the cause of most difficulty if the strike is prolonged.

Cincinnati—Demand on jobbers has increased sharply as a result of strikes. On the most popular items, a form of rationing has developed as a means of conserving stocks and of meeting regular customers' needs.

Los Angeles—With extreme pressure for deliveries exerted by sheet consumers, warehousemen have placed this product on strict allocation. Although most jobbers have additional tonnages enroute, their sheet stocks are expected to be depleted by end of the month.

San Francisco—Overall inventories held by jobbers at the start of the steel strike were excellent. This was due to the end of the 109-day strike of the warehousemen's union coincidental with start of the steel strike.

Rails, Cars . . .

Track Material Prices, Page 122

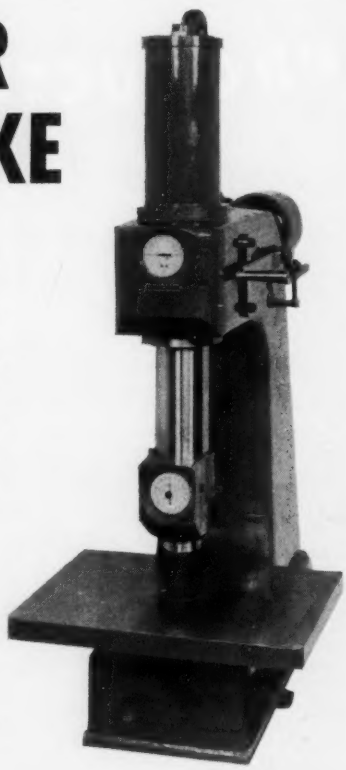
Pittsburgh—Railroad interests are placing rail orders for 1950 delivery. The tonnage involved is substantially less than the amount received in 1949. Railroads have been hardest hit among non-striking industrial groups as a result of the steel and coal strikes. This situation is expected to further accentuate the already depressed orders for freight cars, auxiliary equipment, and rails.

Philadelphia—Pennsylvania Railroad will close bids Oct. 21 on its 1950 rail requirements—60,000 tons, plus or minus 40 per cent. This railroad a year ago inquired originally for 175,000 tons, but later cut back. It is estimated that the Pennsylvania will not lay more than 60,000 tons in 1949. There has been no inquiry for the usual track accessories, although bids were closed Oct. 14 on switch rail crossings, bridge rails and shoes.

Chicago—Due principally to labor strife, most railroads are planning to order only the barest minimum of new rolling stock next year. Car ordering has been virtually dormant for several months and builders have cut their production to stretch out order backlogs as far as possible.

New York—Freight car buying continues light with orders in September totaling 123 units, according to the American Railway Car Institute. Deliveries in the month totaled 6141 units. Backlog as of Oct. 1 was 22,203 cars compared with 108,892 a year ago.

A BETTER LONG STROKE BRINELL



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Large table eliminates extra help in handling. Table remains at a constant level and machine may be readily inserted in your conveyor line.

Straight Roller or Vee Roller table may be substituted for flat table shown.

FAST • ACCURATE • SAFE

Available either direct reading, as shown, or as a plain Brinell in a size to accommodate your work. Motor to suit your current characteristics. Other types of standard machines also, in stock. Special machines built to requirements.

DETROIT TESTING MACHINE CO.

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, state bridge, Yorktown, Va., to Virginia Bridge Co., Roanoke, Va.

1500 tons, gates, stop logs, hoists, etc., for McNary dam, to Consolidated Western Steel Corp., Los Angeles, low $641,280, by U. S. Engineer.

900 tons, Lord Baltimore Press, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, fabricating plant addition, to Pacific Car & Foundry Co., Seattle.

200 tons, state bridge, Bradford county, Pennsylvania, to Pine Brook Iron Works, Scranton, Pa.

200 tons, municipal health center, Philadelphia, to Grays Metal Works Inc., that city.

170 tons, Lynnewood elementary school, Upper Darby, Pa., to Acorn Iron Works, Philadelphia.

160 tons, building, Lebanon Valley College, Annville, Pa., to an unnamed fabricator.

140 tons, building, Baltimore Markets, Vineland, N. J., to Max Corchin Inc., Philadelphia.

140 tons, cabinet painting plant, Kaiser Engineering Corp., Bristol, Pa., to Belmont Iron Works, Eddystone, Pa.

100 tons, addition, chemical plant, Rohm & Haas, Bristol, Pa., to Max Corchin Inc., Philadelphia.

STRUCTURAL STEEL PENDING

675 tons, Public School No. 175, Queens, New York; bids asked.

650 tons, Public School No. 12, Brooklyn, N. Y.; bids asked.

650 tons, Public School No. 32, Brooklyn, N. Y.; bids asked.

630 tons, Memorial Arena, Johnstown, Pa.; Berkebile Bros., that city, low on general contract.

190 tons, manufacturing building, Victor Balata & Textile Belting Co., Easton, Pa.; bids asked.

190 tons, reactor building, Arco, Idaho; bids to Leonard E. Johnson, Idaho manager, Boise, Oct. 18.

Unstated tonnage, veterans hospital, Philadelphia; plans ready by Oct. 20 for bidding Dec. 6.

Unstated, major phase $21 million Lucky Peak project, Idaho; bids to U. S. Engineer, Boise, Oct. 20.

Unstated, materials for 400 unit, cell block addition, Oregon penitentiary, Salem; Decatur Iron & Steel Co., Decatur, Ill., low $297,747.

REINFORCING BARS . . .

REINFORCING BARS PLACED

566 tons, dormitory, Cook county hospital, Chicago, to Joseph T. Ryerson & Son Inc., that city.

465 tons, CHA apartment, site No. 3, Chicago, to Joseph T. Ryerson & Son Inc., that city.

465 tons, CHA apartment, site No. 6, Chicago, to United States Steel Supply Co., that city.

274 tons, freight house, Burlington railroad, Chicago, to Joseph T. Ryerson & Son Inc., that city.

200 tons, St. Patrick's hospital, Missoula, Mont., to Northwest Steel Rolling Mills Inc., Seattle; J. C. Boespflug, Seattle, general contract.

141 tons, Weber high school, Chicago, to Concrete Steel Co., that city.

135 tons, two Washington state bridges, to Bethlehem Pacific Coast Steel Corp., Seattle; State Construction Co., general contract.

120 tons, building, Felt & Tarrant Mfg. Co., Chicago, to Concrete Steel Co., that city.

REINFORCING BARS PENDING

2250 tons, Garrison district, Corps of Engineers, Bismarck, N. Dak.; bids Oct. 26.

1725 tons, chief, Equipment and Procurement Branch, Bureau of Public Roads, Washing-

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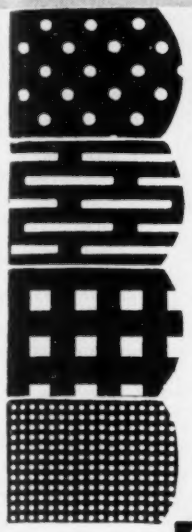

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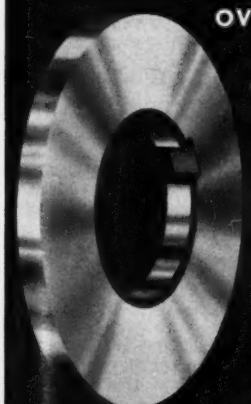

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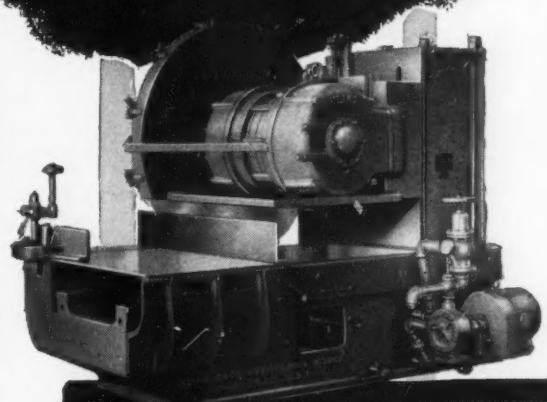
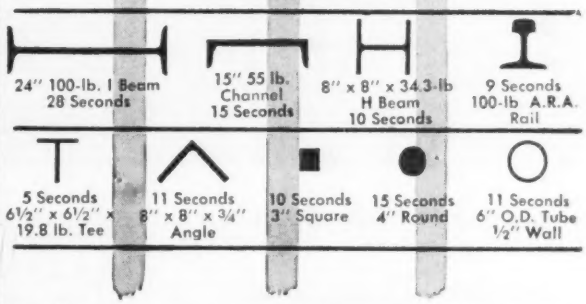


with **KLING** *HIGH SPEED FRICTION SAWS*



Friction sawing is one of few mechanical processes which employ the heat of friction in a useful manner. It concentrates heat on the material to be severed at a rate which is faster than it can absorb heat. The immediate temperature rise of the contact surface is so great that its strength is reduced considerably lower than that of the colder blade rim. This heated surface is readily removed by the blade and permits complete severing of the material rapidly with no loss of metal from the blade.

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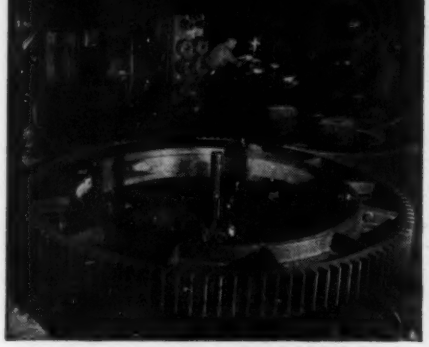

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ton; bids Oct. 25, deformed structural or intermediate grade.

230 tons, U. S. Brewing Co., Chicago; bids asked.

175 tons, Washington state road projects; bids in Oct. 9; 65 tons additional involved in bids called for Oct. 21.

115 tons, dormitory, Purdue University, Lafayette, Ind.; bids asked.

Unstated, $1½ million Park Plaza apartment building, Portland, Oreg.; general contract to Reimers & Jolivette, Portland.

Unstated, $650,000 Dominion Bank building, Vancouver, B. C.; general contract to Northern Construction Co., and J. W. Stewart Ltd., Vancouver.

PLATES . . .

PLATES PENDING

Unstated, 1200-foot, 23-foot diameter, Lucky Peak tunnel; bids to U. S. Engineer, Boise, Oct. 20.

Unstated, elevated steel tank and tower, for McNary dam; Chicago Bridge & Iron Co., Chicago, apparently low $20,895.

Unstated, 60,000-gal., elevated water tank for Bainbridge Island, Wash.; H. D. Fowler & Co., Seattle, low $21,480.

Unstated, bulk fuel storage tank, pontoon bridge, etc.; bids to Bureau of Reclamation, Grand Coulee dam, Wash., Nov. 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, ten 1000-horsepower diesel-electric switch engines, to Lima-Hamilton Corp., Lima, O.; addition of these switchers will give the Baltimore & Ohio a total of 213 diesel units of this type, in addition to 58 road passenger and 112 road freight diesel-electric locomotives.

Cincinnati Union Terminal, two 750-ton diesel-electric switch engines, to Lima-Hamilton Corp., Lima, O.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MONTGOMERY, ALA.—U. S. Engineer, District Engineer, plans a synthetic liquid gas plant; Ford, Bacon & Davis, New York, architect.

CALIFORNIA

LOS ANGELES—Harbor Commission of Los Angeles has awarded contracts for a $577,000 modernization of the Municipal Fish Markets. Undertaken under the harbor's $10 million improvement program, the new fish market will be housed in a 67,000-sq ft building, with a separate structure for refrigeration equipment.

ILLINOIS

CHICAGO—American Can Co., operating five manufacturing units in the Chicago area, is erecting a structure at 6105 S. Oakley Ave.

CHICAGO—Sterling Bolt Co., 209 W. Jackson Blvd., operating a plant at 1228 W. Monroe St., acquired the former Mills Industries plant at Lake street and Kilpatrick avenue.

JOLIET, ILL.—International Harvester Co. has leased about five acres of floor space in the large plant at Rockwell Junction, near Joliet, Ill., which was used for naval storage during the war.

MICHIGAN

DETROIT—Federal Tool, Die, Machine & Engineering Co., 850 Oakman Blvd., has been formed by David M. Levine, same address, for manufacture of tools, dies and machines.

DETROIT—Northeastern Mfg. Corp., 1578 Wellington, has been formed by Carl Bostrom, 204 Avalon Ave., Highland Park, to manufacture tools, dies and machines.

DETROIT—Permanent Mold Die Co. Inc., 15533 Woodrow Wilson, has been formed by Joseph B. Silver, Wilshire Hotel, to manufacture and sell molds.

DETROIT — Walker Stamping Corp., 1069 Beaufait, has been formed by Anthony Walczak, 17172 Waltham, to manufacture and sell machinery, tools and metal products.

DETROIT—Robins Products Co., 14335 E. Eight-Mile Rd., has been formed as a general metal stamping business by Robert L. Brown, same address.

DETROIT—Star Cutter Co., 10040 Freeland Ave., has been formed by Vivian M. Stanley, 15821 Pinehurst, to manufacture and sell cutting and machine tools.

FENTON, MICH.—Universal Machine Co. Inc., 316 Lincoln Ave., has been formed by Donald V. Alpaugh, 513 Wakeman, for tool and die work and manufacturing metal products.

ROYAL OAK, MICH.—San Jan Products Co. Inc., 247 Washington Square Bldg., has been formed, to manufacture aluminum awnings, by Sam Hyatt, 2420 Tufts Ave.

YPSILANTI, MICH. — Ypsilanti Fabrication Co., 2643 East Michigan Ave., has been formed by Don McCrady, 2637 East Michigan Ave., for fabrication of steel products.

MISSOURI

ST. LOUIS—Highway Department officials in St. Clair county, Ill., expect to have completed engineering studies for proposed St. Clair county-Mississippi river bridge, which will connect Cahokia with South St. Louis Mo., at Chippewa street. Rough estimates place cost of bridge at $8 million.

NEW YORK

BUFFALO—M. J. Grass Screw Machine Products Co. has been established at 19 Northampton St. by William N. and James W. Grass.

NEW YORK—Lever Bros. Co., food processor and manufacturer of soap and cosmetics, will move its headquarters Dec. 1 from Cambridge, Mass., to New York. To house its offices the company will build a 20-story office building on Park avenue between 53rd and 54th streets; construction will start next spring and building is expected to be ready for occupancy by the fall of 1951. Lever Bros. will maintain temporary executive offices at 505 Park Ave. and temporary general offices at 80 Varick St.

OHIO

CINCINNATI—Steelcraft Mfg. Co. plans imminent work on an addition to house operations formerly in Joliet, Ill., by Knapp Bros. Mfg. Co., recently acquired. Products at Joliet included metal baseboards, window trim and stools.

CLEVELAND — Ultrakrome Inc. has been formed by Paul Fleischer of Ultrametl Mfg. Co., 2800 E. 55th St., manufacturer of tubular steel furniture, for the purpose of expanding into the chrome plating field. Ultrakrome Inc. will be located at the plant of Ultrametl Mfg. Co.

CLEVELAND—Diamond Alkali Co., Union Commerce Bldg., has entered into a co-operative agreement for further development of the phenol operation of Reichhold Chemicals Inc. in Tuscaloosa, Ala. It is contemplated that under the co-operative plan, the physical assets and operation of the new plant will be transferred to a new Alabama corporation. P. J. Ryan, Reichhold vice president and general manager of the plant, will continue to direct its operation. Diamond Alkali has acquired an option to purchase one-half interest in the new Alabama company.

CLEVELAND—Interlake Iron Corp. has assumed control of operations and facilities of Interlake Chemical Corp. Headquarters will remain at 1900 Union Commerce Bldg. and business will be continued by the Coal Chemicals Division of Interlake Iron Corp.

CLEVELAND—Rex Metal Craft Co., manufacturer of ornamental iron products, 3004 E. 82nd St., is building a $15,000 plant at 7216 Bessemer Ave., where it will move

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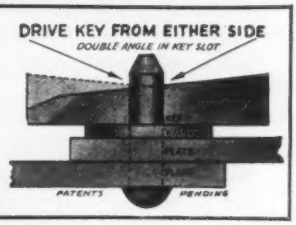

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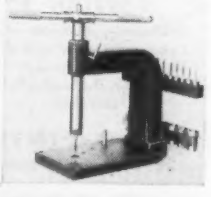

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upon completion of the project. Alfred Klein is president of the company.

CLEVELAND — Straehle Machine Products Co., 1426 W. Third St., will spend over $75,000 for new machinery and a new plant at 12900 Berea Rd.

KENT, O.—Change of Ferry Machine Co., W. Main street, from a partnership to a corporation, and addition of W. B. Fageol Jr. as one of the firm's heads have been announced by Ernest S. Ferry, president. Mr. Fageol, of Twin Coach Co., is treasurer of the reorganized machine firm.

YOUNGSTOWN—Truscon Steel Co., 1315 Albert St., will erect a $100,000 addition to its present building.

OKLAHOMA

BLACKWELL, OKLA.—City, George Fagin, atty., First National Bank Bldg., Oklahoma City, Okla., has plans in progress for power system improvements, cost $1,250,000; Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineer.

OREGON

SALEM, OREG.—State Board of Control will open bids Oct. 21 for boiler plant at The Dalles hospital and boiler plant addition at the Salem hospital. Five boilers and accessories are involved, plans by W. Bruce Morrison and T. E. Taylor, Portland, Oreg.

SALEM, OREG.—Decatur Iron & Steel Co., Decatur, Ill., is low $297,747 for fabricating material for cell block addition to state prison.

VIRGINIA

RICHMOND, VA. — Chesapeake & Potomac Telephone Co. of Virginia plans expenditures of $2,298,800 for improvement and expansion of telephone facilities throughout the area.

WASHINGTON

SEATTLE—U. S. Engineer contracts approximating $5½ million for construction of the Chief Joseph dam will be placed in November. These include the Columbia river bridge, bids Nov. 8, for which $1¼ million is available. Other projects include excavating, utilities, buildings, powerhouse equipment and a steel and concrete bridge. Plans will be ready about Nov. 1 for turbines, Jan. 1 for generators and Mar. 1, 1950, for bridge type cranes.

ALASKA

KETCHIKAN, ALASKA—Harold Calvin, chief engineer, Ketchikan Pulp & Paper Co., announces construction of proposed $30 million plant will begin in the spring of 1950, following completion of access roads.

CANADA

VANCOUVER, B. C. — Construction contract for $650,000 Dominion Bank Bldg. has been awarded to Northern Construction Co. and J. W. Stewart Ltd.

FERROALLOYS

(Concluded from Page 123)

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y.; freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.55c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.